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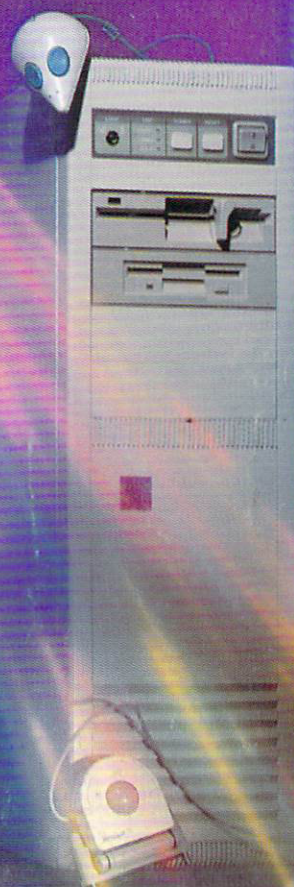
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64/128 VIEW

A new column that looks at Commodore activities around the world makes its debut in this issue.

Tom Netsel

Anyone who owns a 64 or 128 knows that he or she is *not* a member of an exclusive club. There are millions of the 8-biters around the globe, and if all their owners got together, they'd make one huge user group.

In fact, Commodore owners have a lot in common, no matter where they live. Teachers in Canada, Texas, and Israel use their machines to help educate youngsters. Game players in Alaska and India entertain themselves for hours with shoot-'em-ups and role-playing games. Programmers in Pakistan and New Zealand crank out code in BASIC and machine language. And everyone bemoans the fact that new releases for the 64 are as scarce as Sahara snowballs.

In an effort to bring 64 and 128 users even closer together, to share ideas and information, I am planning a new column for Gazette called "World View." It will be written by 64/128 users in different countries who'll discuss Commodore topics of interest in his or her country. Topics may include software, hardware, computer shows, user group activities, BBSs, or anything else that may interest 64 users.

We kick off "World View" in this issue with a look at Commodore activities in England as described by Steve Jarrat. Steve is the editor of *Commodore Format*, the United Kingdom's most popular Commodore 64-specific magazine. Steve touches on a variety of topics, including the ill-fated 64 Game System, the popularity of tape as a storage medium, and

something called game cheats. I hope you'll enjoy his comments about 64 and 128 happenings in the UK.

I'd like to hear from Commodore owners in other countries around the world. So if you'd care to submit a 1000-word article on disk, we'll pay for the ones we publish.

The holiday demand has caused increased production of 64s and 1541s, and Commodore reports that sales have been particularly lively in central Europe. Companies that have needed a computer but couldn't afford one or didn't have access to one until just a short time ago are now buying 64s.

Now that the Eastern nations are swapping the Iron Curtain for Blue Light Specials, low-priced computers such as the 64 and 128 could become hot items. I hope 64 owners in those countries will tell us how things are changing. Are spreadsheets becoming best-sellers, or is *Tetris* still the favorite software buy?

Those of you who own 128s should find the programs in this month's issue to be of special interest. Bruce Bowden has written a handy screen dump and a program that helps machine language programmers configure their 128's memory banking. On *Gazette Disk*, *Trig 128* from James Moore is a bonus program that will help trigonometry students with their math homework.

Another disk bonus is Don Radler's collection of traditional Christmas songs and carols. Don used a music program that we published some years ago to transcribe a number of tunes for your enjoyment. □

GAZETTE

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It's in the Mail

Do you people read your mail up there? For eight years we've been sending you a copy of our monthly newsletter, *Syntax*, and you didn't mention us in your listing of user groups. Would you care to offer a good explanation for such an oversight?

WILLIAM O. NELSON
EL-SHIFT-OH USER GROUP
P.O. BOX 36148
MELBOURNE, FL 32936-1348

Last spring our user group coordinator sent letters to every user group in our files. We mailed hundreds of letters to groups in 50 states and dozens of countries, asking officers to verify addresses and BBS telephone numbers. We carefully explained that if the letter were not returned, we would assume that group was no longer in operation. For the convenience of U.S. groups, we even provided a stamped envelope for the letter's return. As letters came in, we checked them off our list, deleting the ones that did not respond. Your letter was not returned, so we assumed your group had disbanded.

Now, for any other group that was also omitted, here's a chance to make the updated list that we will publish soon. Send your club name, address, and any BBS telephone number to Commodore 64/128 User Group Update, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. Don't rely on your newsletter; send a note.

User Group Association

The North American Commodore User Group Association, which was mentioned in the September issue, is an organization of Commodore 64/128 user groups across the U.S., Canada, and the world. We currently have 73 member groups, representing more

than 5200 individual members. Our goal is to help user groups help users.

NACUGA was formed at the World Of Commodore in Toronto in December 1990. We have grown so fast that we now have two separate offices, one serving Canada and the other serving U.S. groups. The Canadian address is Dave Quinn, NACUGA, Box 2984, Station A, Moncton, New Brunswick E1C 8T8, Canada.

JOSH JACOBY
NACUGA
98-151 PALI MOMI ST. #110-189
AIEA, HI 96701-4332

Unscrambled Words

I once owned a TI-99 computer and had a program that unscrambled words. Unfortunately, I can't remember the name of the program, but my description speaks for itself.

I now own a 128D and was wondering if there is a program of this type for it.

GEORGE H. QUENNEVILLE
VICTORVILLE, CA

I trust you mean a program that will unscramble an anagram, which is a word that is formed by transposing the letters of another word. Enter the following program and see if it does what you want.

When you run the program, it'll ask for a word to unscramble. The program works best with words that are fewer than nine letters in length. The program counts the letters, sets up an array, and prints all the possible combinations of those letters.

The program is not too sophisticated; it merely prints combinations of every letter that you enter, even if that letter has already been used. As a result, a four-letter word will have 24 combinations printed on the screen. A five-letter word will have 120, and a six-letter word will have more than 700 onscreen words. To

make it a little easier for you to find the word you want, the program prints only 80 words at a time until it has exhausted all possibilities.

Oh, yes, if you do check a nine-letter word, you may want to have a sandwich nearby. If the program takes seven seconds to fill a screen with 80 combinations, you'll be at the keyboard for more than eight hours, watching 362,880 combinations print out. Allow for a few extra minutes if you actually read the words that are printed.

```

DF 10 PRINT "{CLR}{WHT}"
CR 20 CLR:INPUT "WORD TO
      {SPACE}UNSCRAMBLE"
      ;SS=N-LEN(SS):DIMC
      (N-1)
GS 30 I=N-1:F=F+1:PRINTS
      $,:IFF=80THENGOSUB
      100
DG 40 SS=LEFT$(SS,I-1)+R
      IGH$(SS,N-I)+MID$
      (SS,I,1)
GX 50 C(I)=C(I)+1:IFC(I)
      <=N-I GOTO30
AD 60 C(I)=0:IFI>1THENI=
      I-1:GOTO40
KF 100 PRINT:PRINT"HIT
      {SPACE}ANY KEY WH
      EN READY"
MP 110 GETAS:IFAS=""THEN
      110
EC 120 IF F<80THEN END
JH 130 F=0:RETURN
    
```

128 Software Wanted

I've taken a little survey of my own, and I'm not happy with the results. In 11 issues of *Gazette* you'd published 44 programs for the 64, four for the 128, and four for both. That is not balanced programming. Come on, readers, submit more 128 programs. I plan to submit mine, myself.

ROGER W. MILLER
PEORIA, IL

Thanks for calling attention to the need, Roger. We encourage 128 submissions and pay for the ones we publish. I'm sure many programmers have good 128 and 64 programs that are just gathering dust. Remember, we can't

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answers
about user group
listings,
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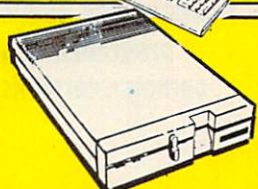
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buy it if you don't submit it.

By the way, we have published a few other 128 programs: Measurement 128 (February 1991), BX BASIC (March 1991), Typing Tutor (April 1991), and Super Cataloger 128 (September 1991). Since these programs were too large to offer as type-ins, we included them as bonus programs on Gazette Disk. The subscription price for the disk and magazine is \$49.95 for 12 issues. Call (800) 727-6937 to order.

Frugal Plus/4

All the Plus/4s and older machines we use here in rural Alaska don't make us backwards, just frugal. In the days before laptops, the Plus/4 was the easiest to convert to 12-V DC operation for use in the bush. The situation is a bit different if you live in one of our fine cities, but rural kids have been happily blasting aliens for years with their 64s and 128s plugged into generators.

My winter hobby is rewriting 64 programs for the Plus/4. Somewhere along the way, cabin fever must have cleared up, but I was left with 1200 programs and files for the Plus/4. Does anyone still use a Plus/4? I'd be pleased to get some fresh input and share some programs for this orphaned machine.

JAMES HEHL
P.O. BOX 877466
WASILLA, AK 99687

Multiplan Wanted

I am using my 64 system in my business. Over the past several years, I have generated hundreds of data disks from various spreadsheets and other programs, but now I'd like additional software. I'd like to purchase a copy of Multiplan. Could you help me find a copy of this program?

TED DACE
OLATHE, KS

Try Software Support International, 2700 NE Anderson Road, Suite A-10, Vancouver, Washington 98661, (800) 356-1179. They have a used copy for \$14.95.

Skip the Folds

I'm sure you've answered this question many times, but how can I print a long program listing that skips over the folds in my computer paper?

HELEN UNSER
ORLANDO, FL

Walter Johnson, from DeKalb, Texas, included just such a tip in a recent letter. "Here's a trick I discovered in making program listings skip over the folds in the paper instead of continuously printing. It makes the program listing look nicer, and it's easier to read when there are no lines printed over the perforations." Load your program, but don't run it. Then enter the following lines in immediate mode.

```
OPEN 4,4:PRINT#4,CHR$(147):
CMD4:LIST
PRINT#4,CHR$(19):CLOSE4
```

BAM Aid to the Rescue

I recently had a problem when my 1581 disk drive crashed, causing me to lose a number of newly created SpeedScript files. The BAM Aid recovery program you included as a bonus on the January 1991 Gazette Disk proved invaluable in recovering the files. Thanks.

MARK REIDEL
LOMBARD, IL

We're glad the bonus program helped. For readers not familiar with Gazette Disk, it is the companion disk for each month's magazine. It contains all the programs that are featured in that month's issue, plus a bonus program or two. Often these bonuses are too large to offer as type-in programs in the magazine.

Which 64 Version?

I've spent hours searching my software for a routine that reports which version of the 64 is present and another that's capable of distinguishing between Commodore computers. Can you help?

FRANK WHITTAKER
AKRON, OH

A popular way is enter PRINT PEEK65534). This returns a value of 72 on a 64 (or a 128 running in 64 mode), a value of 23 on a 128 in 128 mode, a value of 114 on a VIC 20, and a value of 255 on a Plus/4 or Commodore 16.

Early models of the 64 produced different colors when the screen was poked directly. Early 64s produced a white character; revised models produced characters whose color was the same as the screen background, making them invisible. Most 64s produce characters that have the current character color.

You can test this by clearing the screen on your 64, moving the cursor down a few lines, and typing POKE 1024,1. Original model machines will print a white letter A in the upper left corner of the screen. Revised models will show nothing, but you'll see an interesting effect if you press the Home key. Most machines will print a letter A in the current printing color, normally a light blue.

Programs usually work around this variance by poking the color nibbles, but a program could check with a peek of address 59916. Original models will show a value of 1; revised models, 218; and current models, 145.

Send questions and comments to Gazette Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

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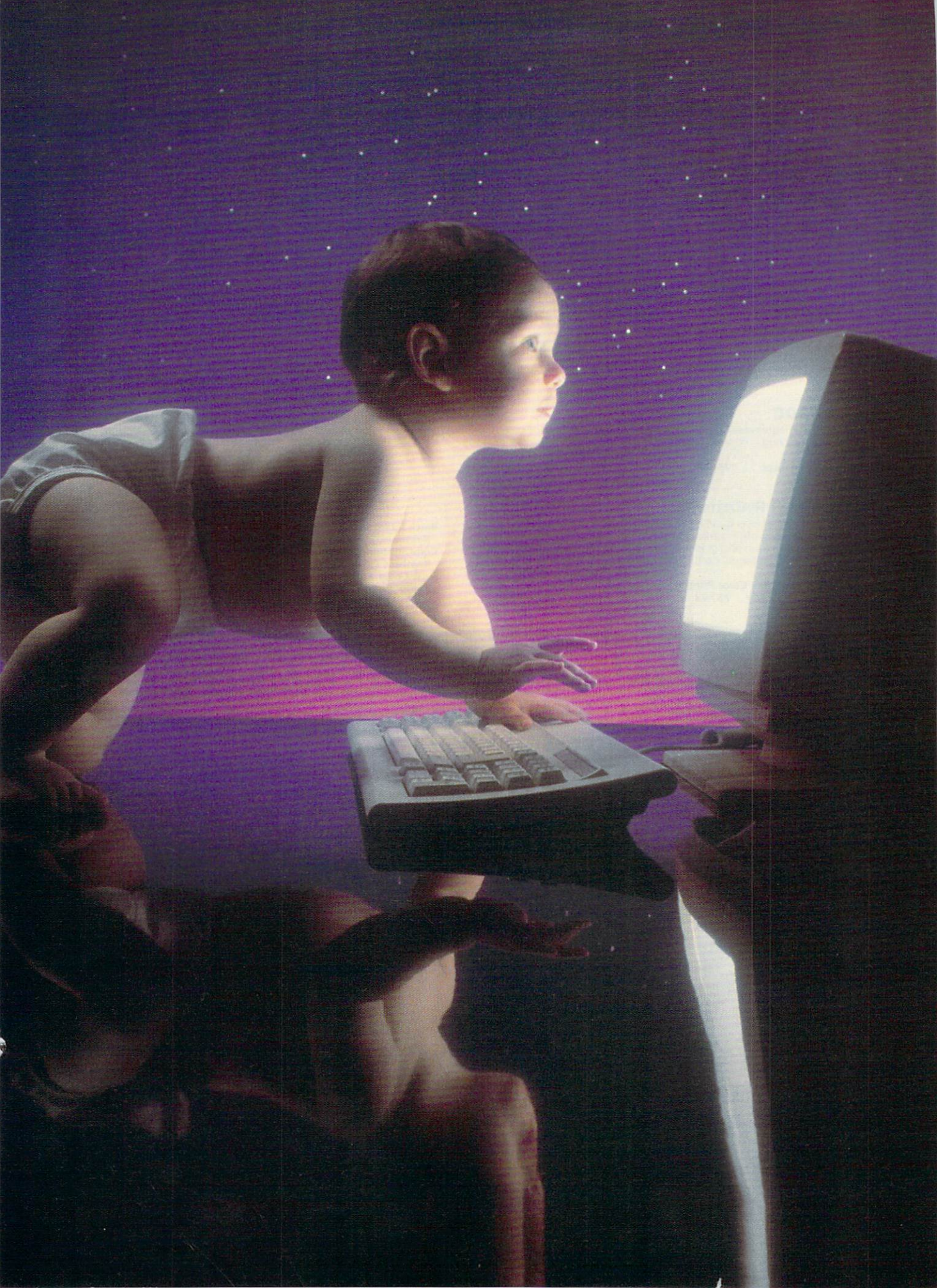
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TOWARD COMPUTER LITERACY

So, you've decided, your youngster is a computer imbecile. The kid is interested only in manhandling a small joystick and shoving images of the Super Mario Brothers around a TV screen, while his Nintendo makes the same disgusting five-tone sound after every move.

You rationalize and tell yourself that this activity is great for developing eye-hand coordination. It must be because the kid can beat you at every activity except taking out the garbage. Deep down, however, this mindless activity irritates you because you know that the kid is missing out on something. The child isn't learning.

If you have a child who spends hours with a Nintendo and if you're like me, you wonder how you can get your kid to spend more time with a computer. How can you encourage your child to become computer-literate? Aren't the schools supposed to do that? The answer, of course, is Yes. Schools do

teach classes in computer literacy, but you can help your child learn these skills—even if he or she is a teenager. Here's how.

Rely on Schools . . . Part of the Time

First, we might ask, what is computer literacy? Is it programming? Should my kid be able to write simple programs? Well, yes, computer literacy may include some programming skills, and most schools offer classes in programming these days, but there is more to literacy than programming.

My own children, introduced to computers in elementary school, learned some interesting things with little turtles and the Logo system. Making that onscreen turtle do what the child wants teaches young people some very basic programming concepts.

Even though my children forgot all about Logo in later years, the elementary course got them used to computers in general. They are not afraid

of the machine—unlike some adults—and they'll tackle any task that interests them. They know that clicking the wrong mouse button or pressing the wrong key on the keyboard won't break the computer.

In the eighth grade, my children took another literacy class. That course taught them to turn on the computer, insert a disk, and format a disk. It also taught them to write simple programs that produced some interesting graphic images. They learned to print these images on a standard dot-matrix printer. Now that was programming!

The problem was that they lost interest in computers the minute the class was over. No transfer or carryover transpired. Boredom seemed to be the main culprit. I'd taught my children these basic computer literacy skills at home, so the material they covered at school during that semester seemed old hat and a waste of time.

For my 13-year-old son, games won out. Computers meant games, and then

BY DOROTHY HEMME

games meant Nintendo. Anything else was irrelevant.

Find Their Interests

So how did I regenerate my kids' interest in computer learning, and how can you? First, cater to their interests. That means games. For years, my son used our Commodore for games. He learned enough to load a disk, call up a directory, and load a specific program in order to play the game. Also, fast load cartridges have their own specific procedures that he had to learn.

Some very intricate games on the 64, like *Airborne Ranger*, require him to format a data disk. This allows him to save his game at a certain place so he won't have to start over from the beginning each time he boots it up. In addition, he learns valuable note-taking

our test went to me.

Next, we compared features. Nintendo has a joystick and fire button. The 64 has those items plus a full keyboard and eight function keys that can be programmed with different features. This, he admitted, increased the wonderful complexity of the 64 games.

Finally, I asked him to quit his Nintendo game and go unload the dishwasher. He couldn't or wouldn't (I'm not sure which) because he would lose his game unless he finished. On the 64, several of his games have an option that lets him save a game to disk.

Cater to Their Needs

My high school daughter, on the other hand, cares nothing for games or the computer. In school she discovered that she had to write numerous essays,

TEACHING THE TEACHERS

Wenden Elementary School in Wenden, Arizona, has four Commodore 64 computers. I have taught kindergarten through eighth grade for seven years with these same 64s. They are used and abused by a variety of students from 8 a.m. until 3 p.m. each school day. If there is any better computer for a school, I have yet to find it.

Convincing other teachers how great the 64 is, however, has proven to be difficult. Two of my friends purchased Apple computers this year, after I spent hours with them demonstrating the virtues of the 64. Obviously, advertising has a tremendous effect even on intelligent people.

Last year, through a supermarket's Apple for Computers program, we managed to save enough receipts for an Apple IIc+ and software. The graphics on the Apple are terrible; the educational programs boring and twice as expensive as most 64 programs. I am really frustrated that Commodore didn't advertise the 64 and get it into

schools. Schools don't need the expense of an Apple or IBM, and children don't benefit from extra memory or other expensive features.

I'd like Gazette to show me how other schools use their 64s in labs. I'd like to know that other teachers appreciate the variety of educational programs for the 64 that I do. I'd like to hear from others who use GEOS. It's such a fantastic program that my students always ask for it when I give them a choice of software. Students in the lower grades would spend all day with Microgram's *Big Math Attack* if I'd let them. They even choose it on game day, when they can have their choice of any software we have.

Well, I just wanted this chance to vent my feelings. I just get so irritated when people think the Apple is so great for classroom work. I'm one who knows better.

JEANNE YUELL
P.O. BOX 338
WENDEN, AZ 85357

skills when he has to write down codes, instructions, and keyboard functions and commands—this in spite of keyboard overlays. Since he loves playing games, I used that to my advantage, and he learns some important computer skills while having fun.

My son loves Nintendo, and he swears that its graphics are better than the 64's. So we did a comparison, sort of like the taste tests of the cola wars a few years back. I gave in on that one and admitted that perhaps he was right; the Nintendo graphics may be a little better. Since he won a point, that satisfied his adversarial urge, and he continued with the test.

Next, we compared sound. Aha! Nintendo has only a few preset tones, whereas the 64's three voices offer a wide variety of music, synthesized speech, and battle sounds. Round 2 of

and they had to be typed. The choice was clear. She could use either an old manual typewriter with erasable bond paper or the computer. When she discovered that typing errors could be corrected easily, her spelling could be checked, and her paper could look professionally printed, the computer won this contest hands down.

Even though my daughter hadn't yet taken typing in high school, she was pretty good with two fingers. All of a sudden, she became interested in a computerized typing tutor and learning keyboard skills.

With a word processing program, she learned how to call up a directory, set margins, and other skills of writing and composition.

Then, of course, she had to revise, edit, check the spelling, save her work for later drafts, and print it out. Those

activities encompass many computer literacy skills needed in today's society. More than programming, people today need to know how to use the machine and the various types of software. And I had her interested.

Let the Kids Talk

The greatest boon to computer literacy in our family came through a \$99 modem. QuantumLink garnered the interest of both kids when they discovered People Connection. People Connection lets them talk with dozens of other teens across the country. The conversations are live and cover a variety of subjects. To them it's sort of like the Citizens Band radio craze of a few years ago. The kids like to gab with anyone.

In the interest of saving money, I limit the time that they may chat on Q-Link. They have fun online, but at the same time they had to learn the simple computer and modem hookups and the necessary software commands in order to use the QuantumLink telecommunications service.

All of this learning, which was just a game to them, displayed what I consider to be some sneaky teaching on my part as a parent. I used their interests and sense of fun to help them become computer-literate. They learned about baud rates, downloading files and programs and saving them to disk, and printing sequential files when they wanted hardcopies of their electronic mail or a file from Q-Link's encyclopedia. They became experts using programs such as *Omega-Q*, *Lynx*, *Library*, and *Squeeze-Unsqueeze*.

More Than Literacy

Later, I downloaded terminal programs and files from Q-Link that listed BBS numbers for our area code. That clinched it. My son started evaluating all the terminal programs I had downloaded until he found just the one he liked. He had to learn about XMODEM and Punter protocols and about echoing and duplexes. He quickly found out how much the buffer would hold. He and his best friend called each other constantly to talk on the computer instead of the telephone. As a result, my son quickly learned keyboard skills. He downloaded dozens of files from local BBSs and user groups. Eventually, when the need arose and he wanted to conserve disk space, he queried me about how to scratch files he no longer wanted. He also learned the pitfalls of constantly scratching and saving without validating.

Finally, my son learned to play computer games via modem with a human being on the other end of the telephone line trying to "kill" him. He had

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to think quickly, matching wits with a human opponent rather than a computer.

He developed time management skills: when to do his homework and household chores. He then made specific appointments he had to keep; the next game was at 8:00 p.m. As a side effect, he had to be nice to the rest of his family, since he tied up the phone and we couldn't use it while he was on the modem. He also had to accept that he had time limits for playing games and using the computer. Thus, efficiency screamed out as the watchword of this teen's day.

The Last Word

Are my children computer-literate? I think so. At least by my definition. In good time, they'll take the last high school course in computer literacy that's required by the state of Texas to get their diplomas. They may or may not turn into computer programmers or technicians, but they'll have most of the essential skills that Americans of their generation are going to need. They have the ability to work the machine and, better yet, to make the computer work for them.

Dorothy Hemme teaches English at a high school in Sugar Land, Texas. □

Gazette is looking for utilities, games, applications, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it on disk to

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ONLY ON DISK

In addition to the type-in programs found in each issue of the magazine, *Gazette Disk* offers bonus programs and original 64 and 128 artwork. Here are this month's bonuses.

The Raven

Daniel Lightner
Sidney, MT

Enter this machine language adventure game, and you'll find yourself in a three-dimensional maze that's filled with valuable treasure. The object is to locate the treasure and return it to a special storage area. The only obstacles are the puzzles that you'll have to solve and a number of deadly creatures blocking your path.

You are not alone, though. A friendly Hobbit named Harvey will help you find your way through the maze.

Trig 128

James Moore
Cleveland, OK

Use this handy 128 program to help you solve any triangle, not just right triangles. The program calculates sides to four decimal places and angles to the nearest second. The program will also help you determine the area of a triangle if you know an angle and the length of its two sides or if you know the length of three sides.

This program can be a real help to trigonometry students—but that's not all. *Trig 128* can also be used to find the distance between any two Cartesian coordinates.

Christmas Tunes

Don Radler
Cape Coral, FL

Enjoy these traditional Christmas songs and carols that have been collected by Don Radler. They can be played on the enclosed music program.

Gazette Gallery

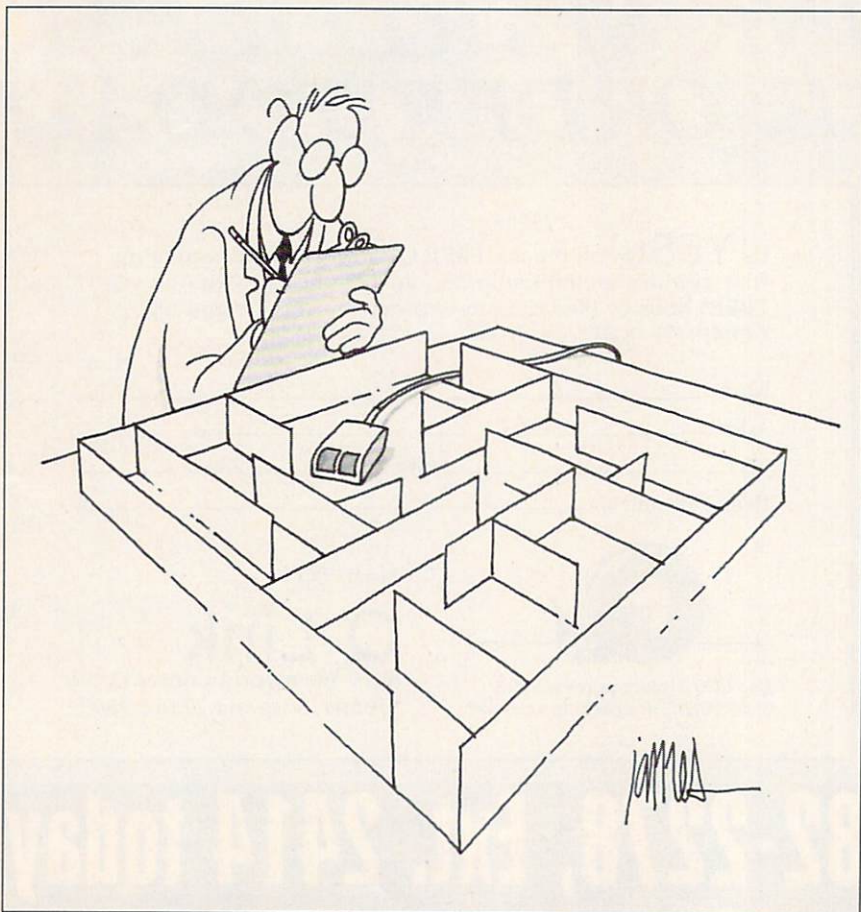
Picture of the Month
"Rage"

By Jeff Boyle
Bethlehem, PA

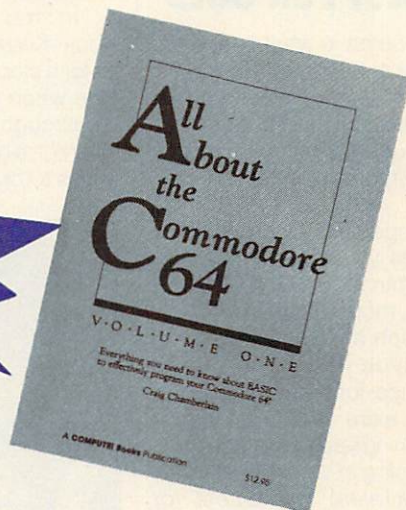
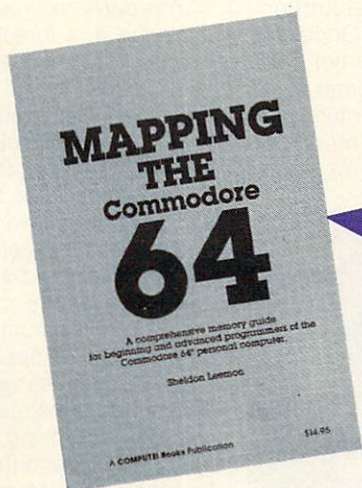
"'Twas the Night"

"Santa's Best"

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DUCKTALES: THE QUEST FOR GOLD

Do you have what it takes to lead a band of explorers around the world searching for treasure? As Scrooge McDuck you have 30 days to earn more money than your old nemesis Flintheart Glomgold. In your search for riches you can explore any combination of caves, jungles, mountains, or forests.

Each area offers a different type of adventure and chance for wealth. You can earn extra money by photographing rare animals or barnstorming in your plane. In all, *DuckTales: The Quest for Gold* offers a wide range of possible strategies, and the game works on many interesting levels. Disney has packed several entertaining games into one story line.

The game opens in Scrooge's office where you choose from three main game activities: diving for rare coins, investing in the stock market, or exploring regions of the globe. You have no cash reserves when the game begins. Diving for coins is the simplest activity, but the one least likely to yield success. You simply enter Scrooge's vault and dive into the pile of coins, hoping to retrieve one worth \$1,000. You'll succeed often enough to make this a good first-day activity, but it's not worth staying more than a day there.

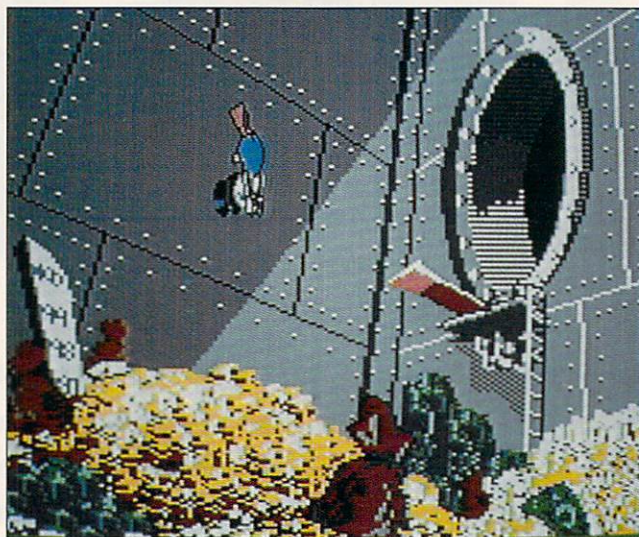
Once you have earned some money, you may choose to make it grow by investing in the stock market. The market consists of approximately 30 stocks, with prices ranging from less than \$10 to well over \$100.

As you scan the list, you'll receive more detailed information about each company and one of five chart letters.

In the documentation are five different charts which can be used to predict changes in the value of each stock. Knowing the chart letter for a stock will help you decide when to buy and sell.

Although the charts are all different, a good general strategy is to buy around the 5th

there, and the number of days required to get there. Most locations take two days of travel time and one day to explore. Once you choose a destination, you must fly your airplane there. Flying is an adventure in itself. The only controls you have are loops up, loops



Dive in Scrooge's vault and you might come up with a coin worth \$1,000, but other activities can earn you more.

or 10th day and sell on the 20th day. You may also try to hold a stock until the 30th day, when all stocks reach their top value, but this can be dangerous. Random events occur almost daily, dramatically affecting the value of individual stocks. So, if you invest, check your stock's progress frequently.

Of course, you cannot invest until you have earned some money. That means you'll have to go exploring. Scrooge's office is equipped with an electronic atlas which you use to plan your trips. The map is accurately drawn and contains approximately 30 places to explore, such as Yellowstone Park and the Whatsamatterhorn.

You can read about each location, the treasure hidden

down, and acceleration. You cannot easily make the plane fly straight.

Balloons above, mountains and power lines below, occasional falling pianos, and even clouds will impede your aerial progress. Your plane, being made of rubber, can bounce, but not often. If you can't make it all the way to the hangar and you crash, you'll still reach your destination, but you'll lose one day and a substantial part of any money you may be carrying. It is wise, therefore, to go regularly to the Scales of Macaroon to deposit your money. If you get really good at flying, you may want to try barnstorming for extra money, but the \$50 bonus it pays hardly makes it worth the effort.

The treasure locations are divided into four types. The easiest is big game hunting—with a camera. You wait at the edge of a forest to take pictures of rare animals as they peek from behind rocks, trees, or bushes. Your only limits are the clock and your roll of 12 pictures.

Each picture of an ordinary animal is worth \$50, and each unique one \$500. My three-year-old son liked this part of the program best. He loved hunting pink elephants and spotted zebras. My favorites were dolly llamas and sausage lynx.

Cave exploring has a much faster pace than photography. You are in a maze of tunnels with each screen representing a crossroad. A map of the cave is provided. The map's completeness depends on the difficulty level you chose at the beginning of the game. It is a good idea to press the P key to pause the program in order to study the map before you begin.

Once you start, avoid the green slime areas, which lead to pits, and move quickly to stay ahead of an Egyptian mummy that is pursuing you. The value of the treasure can be large, and you can pick up extra bags of cash along the way.

The other two adventures are similar to joystick-driven arcade games. In one you make your way across a swamp by climbing trees, riding on hippopotami, and swinging on vines. You must avoid an array of coconut-hurling monkeys, slithering snakes, and sinking turtles.

The other adventure takes place on a mountain where you jump on ledges and duck into caves. You must avoid goats, boulders, and other obstacles.

In each case you are allowed to send your three

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nephews on the adventure, and your party fails if all three nephews fall off the mountain. These adventures require thoughtful planning and careful execution, as well as a dexterous touch with a joystick.

DuckTales is a thoroughly enjoyable game with many features to recommend it. The graphics are outstanding, and the sound effects complement the action. The program is best run on a system with a color monitor and a joystick, but neither is required. If the program has a flaw, it is the time required to load each screen, but this is more the fault of the Commodore's limited speed than the program itself.

As an educator I appreci-

ate the way the stock price charts, the electronic atlas, and the mazes make learning and thinking fun. Having the option to choose from a variety of game formats makes the program suitable for a wide range of abilities and interest levels. This game will appeal to kids of all ages. Best of all, the program and excellent documentation are filled with Disney's whimsical sense of humor. *DuckTales* is a treasure.

JIM SMITH

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TEXT PRINT

If you use *geoWrite*, you know it's an excellent graphic word processor. However, even the best graphic fonts sometimes lack the quality to make them appropriate under all circumstances. Your printer probably has a near letter quality (NLQ) mode, but *geoWrite*'s ability to utilize the NLQ features is limited. It allows no pitch, font, or style choices whatsoever. These limitations make it necessary occasionally to use another word processor.

If you love the WYSIWYG environment as much as I do, you probably wish there was a way around these limitations so you could make *geoWrite* your only word proc-

essor. A talented programmer named Terry Van Camp has something called *Text Print* that may do just that.

Text Print V2.5 is a piece of shareware which can be downloaded from Quantum-Link or ordered from the address below. In the *Text Print* package you'll also get additional files: *Custom Print*, *Text Print* documents, Zero Fix, and three fonts to help maintain an accurate screen display.

The excellent documentation explains how to use the *Custom Print* program to create one or more customized versions of *Text Print* for any printer. Note that the *Text Print* file you want to customize must be ahead of all other such files on the desktop.

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You will be entering printer commands to be executed when an option is selected from the *geoWrite* Style menu. For average use, it's probably best if you stick to equivalent decimal printer commands, such as italic for italic, bold for bold. Look for these commands in your printer's manual.

Some printers use a 0 as one byte of their decimal command strings. Since *Custom Print* doesn't recognize 0 as a byte, the Zero Fix file may have to be used. However, I have found that substituting the number 128 for the 0 works just fine for me.

This program is easy to use. Just type a *geoWrite* document as you normally would, using any style changes you like. Then follow the manual's print-out instructions. Be sure to update the document just prior to printing. Updating isn't automatic as it is in a regular *geoWrite* printout.

Although the latest version has corrected earlier problems and added many excellent features, *Text Print* still isn't perfect. Here are two quirks.

Never attempt to format a paragraph indention on the very first line of any page. Press Return to create at least one blank line at the top of a page and then put in the paragraph indention.

Don't assign a style change to a word that extends to the last column in a line. That is, if the word were one character longer, it would wrap.

These are minor inconveniences that hardly outweigh *Text Print's* many outstanding features. For example, it accesses *geoWrite* documents from up to three drives and permits paging through all documents on each disk. Full justification, tabbing, and multiple document printouts are possible, in addition to supporting all style combinations allowed by your printer.

Since *Text Print* is a Desk Accessory, it isn't necessary to leave *geoWrite* to print a document. You should be impressed with its ease of use and flexibility. I know I am!

ROBERT NELLIST

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REVIEWS

DREAM TEAM: 3 ON 3 CHALLENGE

If it's too cold to go outside and shoot a few hoops with your buddies and there are no basketball games on television at the moment, then pump up your Nikes and head for your trusty 64. Players who want an exciting and quick basketball game have had their prayers answered with Data East's latest addition to its MVP Sports line, *Dream Team: 3 On 3 Challenge*.

Dream Team, a pure arcade game, offers one-on-one and two-on-two games in addition to the three-on-three mode in the title, practice modes, and demo games. There are 26 players in the game's roster, but only 3 of them are NBA players: Patrick Ewing, Dominique Wilkins, and Joe Dumars. The rest of the players on the roster possess the names of the designers and producers of *Dream Team*. The challenge of *Dream Team* is to take on these 3 stars with a team of your own.

Player selection is very liberal in *Dream Team*. You could put together two teams with the same players for an even match up. If you want to go even further than this, you can have one team with all three players the same. This flexibility allows physically impossible fantasy games as well as games of varying difficulty.

The game selection menu offers one-on-one, two-on-two, three-on-three, practice games for one or two players, and a demo game. After game selection, scroll through the players you want for the teams, select one of three courts, choose three-on-three or standard rules, pick winners or losers outs, and the game begins. You can return to the main menu at any time by pressing the Run/Stop key and responding at the prompt with Y to confirm.

Gameplay is very quick in *Dream Team: 3 On 3 Challenge*. Player control is easy to pick up, so you can keep up with the opposition after a game or two. Move the joystick to direct the currently selected player. Hold down the button to shoot the ball. Quickly press the button to pass the ball to another team member or switch players. Press the button under the basket to try to grab a rebound. In no time at all you'll be able

to take on the "dream team" of Dumars, Ewing, and Wilkins!

Dream Team games follow the rules of basketball, with violations resulting in change of possession except in the case of personal fouls. Three-on-three game rules result in quicker games than those played with a full team of five players, and it is often more difficult to win games under these conditions. There's just no breathing room. Three-on-three games differ from the standard game in a variety of interesting ways. There are no free throws, the clock doesn't stop, games are played to 25 points or 20 minutes, the shot clock and 3-seconds-in-the-key violations aren't in effect, and players abide by losers outs.

To make the game more interesting, the designers have included four rotation plays. You select a play before you pass the ball inbounds. Unfortunately, the manual doesn't describe or provide information about the plays. You have to figure them out on your own.

The players on the roster in *Dream Team* each have their own statistics. Rebounds and shot percentages really make a difference in a game. You'll notice this particularly when you shoot the ball. A lot of times, you may have let the ball go at the top of the player's jump, but the ball misses the basket. That's a result of the player's statistics. You'll learn very quickly that three guards might make an interesting team, but it's not a practical team if you want to score big. This touch of realism makes the game more difficult and frustrating. It is even more difficult to control the ball or steal it when the teams are under the basket in three-on-three games. You just can't see the ball because of the crowd of players. The designers should have remedied this situation. Other than these problems, you'll find that *Dream Team* is a capable game, full of challenge and basketball action.

Dream Team graphics are not the best. Although the animation of the characters is nice, colors for the players and the backgrounds are not very good. This leads to a problem with player identification under the basket in three-on-three games.

Although *Dream Team* looks somewhat drab, other features aid in game-

play. Messages pop up occasionally at the bottom of the screen to update the players, such as STEAL, CHARGING, and TAKE BALL OUT. Also, the shot clock and game clock are right in your face on the sides of the screen. Sound effects and music are nothing special.

Without bells and whistles, *Dream Team* manages to pull through with the gameplay and novel idea of the "dream team" of Dumars, Ewing, and Wilkins. The game is a lot of fun, and it's even better with two players because the computer sometimes runs right over you in one-player games.

Watch the computer demo first to get an idea of how to approach the game and

to learn the rotation plays for a further advantage. As one of the few software companies still supporting the 64, Data East occasionally manages to bring down a game from the high-end computers. Although other conversions have been cleaner, *Dream Team* is still worth the money. Despite the lack of pretty graphics and impressive sounds and music, *Dream Team: 3 On 3 Challenge* should keep basketball fans happy for hours.

RUSS CECCOLA

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WORLD VIEW

Steve Jarratt

VIEW FROM THE U.K.

Believe it or not, the 64 is still one of the best-selling computers in Europe. Tumbling prices, plus the fact that competing 8-bit machines—Sinclair Spectrum and Amstrad CPC—are pretty much on their last legs, mean that the 64 is the only really viable computer in the sub-100-pound (\$170) range. The next step is to an Amiga, which, at 400 pounds (\$680), is a hell of a jump. So, against all the odds, Commodore's ten-year-old machine refuses to breathe its last.

After four or five years of leaving the machine to wander in the 8-bit wilderness, Commodore finally recognized the possibilities of the beast and decided to do something with it. Great, we thought. Enter the 64 Games System (GS). Ah, not so great. Basically, they took the 64 circuit board minus its keyboard, twisted the cartridge port so that it sat on top, shoved it all into a gruesome beige case resembling a twenty-first century coffin, and—bingo—a game console!

The UK is, at the moment, in the grip of console mania. The Sega Master System and Mega Drive have taken off in a big way, while Nintendo's Entertainment System and Game Boy are starting to make waves (at last). Sega's Game Gear is now available, and people like me spend huge amounts of money on Super Famicoms (Super NES) imported directly from Japan. So, in a bid to take a share of this burgeoning market, Commodore unleashed its GS on the game world. Publishing houses across Britain started producing cartridges for the machine, and the 64 magazines all tried to make it sound

like a good really thing.

It bombed—horribly. Practically no one bought it, and within six months of its release last year, it could be found in high street retail stores slashed to around 20 quid (\$34). However, all was not lost.

As everyone knows, the majestic isle known as Britain resides on a small planet orbiting the Earth. That's why we get movies a year after you guys in the States and game machines ten years after the Japanese. It's also the reason why the majority of 64 owners load in games from tape. Yep, you heard me right: audio tape—on cassette. (You may laugh, but some tape-based fast load systems can actually get games into memory faster than Commodore's old 1541 disk drive.) As you can imagine, tapes are starting to look a little dated; they're wonderful for budget games (titles produced cheaply and quickly for sale around the 3-pound [\$5] mark), but pretty awful for big, multiloader titles.

The legacy of the 64GS is that occasionally we get games for it on cartridge. This means instant loading, loads of memory, and wonderful reliability. The best of the bunch so far have been *Robocop 2*, *Pang*, *Plotting*, and *Navy Seals* from Ocean, plus *Myth* and *The Last Ninja 3* from System 3. These cartridges (at around 20 pounds or \$34) are more expensive than normal 64 games on tape or disk, but if you're after some decent titles, you could do worse than plugging these into your machine. They may or may not find their way into the U.S.

I hear that game cheats in the U.S. are almost unheard of, which really surprises me. A major part of our 64 mags are given over to POKES which enable players to alter the game code itself, providing infinite lives, infinite time,

no collision detection, or whatever's needed to make the game completable (or in some cases, playable). You simply poke a number into a specific memory location, replacing the original variable with one of your own. In most cases it gets rid of a paltry three lives in favor of, well, lots and lots.

You can either install the new variable before the game loads or break into the game while it's running. The former involves a listing which is typed in and loaded beforehand that interferes with the game loader. The latter resorts to cold starting the 64. The simplest way to do this involves the employment of a special tool called a metallic stationery binding system—or paper clip, as it's known over here.

To hot wire a 64 you have to contact the two pins labeled A and C on the cartridge expansion slot (as you look at it, they're on the bottom row, first on the right and the next but one along). The 64 will reset to the blue boot-up screen. If you have a 128, hold the Commodore key down so you can enter said POKE.

For instance, if you have that old Brøderbund title, *Stealth*, reset the machine, type POKE 30590,173, press Return, then type SYS 53055. You'll now have an infinite supply of Stealth craft at your disposal. (NOTE: Brave 64 owners who dare to try this at home do so at their own risk. Don't blame us if you hit the wrong pin and blow a fuse!)

Steve Jarratt is the editor of Commodore Format, the best-selling 64-specific magazine in the U.K. (and probably all of Europe). He can be reached in care of his magazine at Future Publishing, 30 Monmouth Street, Bath, Avon BA1 2BW, England. □

**After ten years,
the 64 is
still one of the
best-selling
8-bit computers in
Europe**

MACHINE LANGUAGE

Jim Butterfield

PROGRAMS, CONSTANTS, VARIABLES

Programs consist of code; constant values or strings; and the variables that count, add, subtract, buffer, or whatever. The first two parts rarely change.

Generally, you'll find that program code comes first, then constants, and finally variables. Programs and constants are usually close to each other. If they are widely separated, you would need either two separate loads or a lot of "dead bytes" between the two. Some programmers leave a small amount of space between the program code and the area set aside for constants to fit in late program changes (or patches).

Variables can sit anywhere in memory. There's no reason to put them in any particular place, as long as variables are kept far from code and constants. The contents of this area are not loaded from disk. Since you won't know what's in the variable space when the program starts, it's important to initialize such variables by putting data in before you take data out.

Most programmers try not to mix constant values and program code. Keeping them separate makes it easier to disassemble code. When constants are mixed in with code, the disassembler tries to read the constants as if they were instructions. Also, since program branches can reach only a limited distance, keeping all your code together can make your program more efficient.

Though these are not fixed and unbreakable rules, organizing your program is in your best interest. Like all generalities, there are exceptions, but it's usually the case that neat

programmers are troubled by fewer bugs than their spaghetti-code cousins.

We'll write a simple program here to illustrate this kind of organization. Program ECHO will print a title, accept a line of input, and then print the line back three times.

A quick first run indicates that the code will stretch from about \$2000 to \$2045. Let's leave a little space and put our constant values starting at address hex 2050. In this case, we have only the title, *ECHO!*, and the repeat signal ("ECHO:"). Including the following Return characters, that's only a dozen bytes.

As I mentioned, finding a location for the variables is much less critical. Although you have the whole of memory to choose from, it's common to pick a nearby location for variables. Perhaps your program or subroutine will share the computer with other code, in which case it's a good idea to keep the whole action (code, constants, and variables) within a bounded area.

In this case, we have a Y-Save variable—one byte—and the input buffer which will hold the message to be echoed. I've picked nearby locations \$2060 and \$2068 to hold these. We might make a mental note that the input buffer area is, say, 80 characters long. That would make it reach from \$2068 to \$20B7. But since we have no other variables, we won't need to count too carefully.

Here's the code:

```
2000 A2 00 LDX #$00
2002 BD 50 20 LDA $2050,X
2005 20 D2 FF JSR $FFD2
2008 E8 INX
2009 E0 06 CPX #$06
200B D0 F5 BNE $2002
200D A0 00 LDY #$00
200F 8C 60 20 STY $2060
2012 20 CF FF JSR $FFCF
2015 AC 60 20 LDY $2060
```

```
2018 99 68 20 STA $2068,Y
201B C8 INY
201C C9 0D CMP #$0D
201E D0 EF BNE $200F
2020 20 D2 FF JSR $FFD2
2023 A2 00 LDX #$00
2025 BD 56 20 LDA $2056,X
2028 20 D2 FF JSR $FFD2
202B E8 INX
202C E0 06 CPX #$06
202E D0 F5 BNE $2025
2030 A2 00 LDX #$00
2032 A0 00 LDY #$00
2034 B9 68 20 LDA $2068,Y
2037 20 D2 FF JSR $FFD2
203A C8 INY
203B C9 0D CMP #$0D
203D D0 F5 BNE $2034
203F E8 INX
2040 E0 03 CPX #$03
2042 D0 EE BNE $2032
2044 60 RTS
```

The program needs to be followed by the constants. In this case, the two strings used by the program. There's a little empty space before our constants appear. Remember that these are DATA values: don't try to assemble them!

```
2050 45 43 48 4F 21 0D 45 43
2058 48 4F 3A 0D
```

Here's the BASIC version:

```
100 DATA 162,0,189,80,32,32,
210,255,232,224,6,208,245
110 DATA 160,0,140,96,32,32,
207,255,172,96,32
120 DATA 153,104,32,200,201,13,
208,239,32,210,255,162,0
130 DATA 189,86,32,32,210,
255,232,224,6,208,245
140 DATA 162,0,160,0,185,
104,32,32,210,255,200
150 DATA 201,13,208,245,232,
224,3,208,238,96
160 DATA 0,0,0,0,0,0,0,0,0,0
170 DATA 69,67,72,79,33,13,
69,67,72,79,58,13
200 FOR J=8192 TO 8283
210 READ X:T=X
220 POKE J,X
230 NEXT J
240 IF T<>10324 THEN STOP
300 SYS 8192
```

**Neat
programmers
usually put
program code
first in
memory, followed
by constants,
then variables.**

Steve Vander Ark

ATTENTION, GEOS SHOPPERS

All right, let's talk seriously. When it comes to Christmas, we don't put things like dictionaries or underwear on our lists, right? What we really want is computer stuff—GEOS stuff, if possible.

But that's not always easy. You can't send people out to the mall to the GEOS store to fill your stocking with geoGoodies. Most really good software coming out for GEOS is from independent programmers who sell their work themselves or upload it as shareware to places like QuantumLink. Unless your family is unusually computer-literate, they won't have the foggiest idea how to find GEOS items. It's easier for them to buy you violet socks or musical reindeer ties.

Don't despair. There actually is such a thing as a geoStore, and while it's not at the mall, it's about as user friendly as you could want. It's a mail-order outfit run by a talented artist named Susan Lamb.

She realized that many GEOS users don't have access to the new and exciting software that independent programmers are producing, so she decided to bridge that gap. At the same time, she offered her own clip art. If you haven't seen Lamb Art & Design clip art before, you owe yourself a look; the quality will blow you away.

Lamb got into GEOS early, beta testing for Berkeley and demonstrating what *geoPaint* could do. She spent some time as the editor of *geoWorld* magazine, editing and writing many how-to articles. She's now among the more knowledgeable users of the system's graphics programs.

To share some of this expertise, she's working on a book that deals with *geoPaint* and

geoPublish. When she was asked to produce some artwork for the new *GeoWorks Ensemble*, she acquired an IBM computer; now she's rapidly becoming addicted to *geoDraw*, which is included in *Ensemble*. More than a drawing program, its text-handling capabilities place it in the category of *geoPublish* but take advantage of the added speed and memory capabilities of the IBM machines.

So, has Susan Lamb abandoned Commodore GEOS for Big Blue pastures? Not at all. If anything, her IBM gives her a new resource for Commodore GEOS graphics. The wide variety of scanners and digitizers available at a reasonable cost for the IBM help her to create graphics which she ports to Commodore GEOS. Using all of these tools, the geoStore offers not only clip art and page templates but also personal clip art—artwork created to order, including original art, photos, hand lettering, logos, and so on.

Besides Lamb's excellent graphics, geoStore's catalog includes some of the best products and services from elsewhere in the GEOS community. RAM expansion upgrades are advertised at good prices from Melvin Montgomery, (CMDR FIXER on Q-Link). Other GEOS art is featured in the geoStore catalog, including cartoons by Dale Beach and *GeoWorks Ensemble* clip art by Jay Degn. Some of the more exciting GEOS software coming out from the independent programmers is also available, including *geoPrint*, a *Print Shop*-style application, and scads of user disks filled with public domain's best.

The geoStore catalog is the perfect thing to leave lying around under the noses of those who will be buying you Christmas presents. To get a copy, write to geoStore, 3575

East County 18th Street, Yuma, AZ 85365.

All the great Christmas presents aren't public domain or shareware, of course. There are a number of commercial products which no GEOS aficionado should be without. All of these are available through mail-order firms that advertise in this and other magazines; many might still be stocked at places like Electronics Boutique as well. (We'll get your family into the mall yet!) Here's a list of some of my favorites GEOS goodies.

Maverick is a must for any GEOS user. The GEOS bootmaker routine allows you to make your own boot disks for any kind of drive. And if you've ever fallen victim to Berkeley's copy protection trap with a wrong answer during installation thereby losing the use of an application forever, *Maverick*'s ability to strip the protection from files will be an answer to your prayer. Added bonuses are a fast file copier and a sector editor designed to read GEOS disks as well as Commodore-formatted disks.

Graphics Bundle is a collection of programs from Free Spirit now available for one amazingly low price through Solutions Unlimited. Commodore graphics come in a wide variety of formats, of course, and it takes a little manipulation to get them into the GEOS environment. The software in this package gives you the tools to do the necessary conversions and a program called *Graphix Link* to port them into GEOS. The programs run in native 64 mode, not GEOS, so larger projects could require excessive mode-switching unless you plan ahead a little bit.

Send your GEOS questions to Steve Vander Ark, in care of this magazine. He can also be reached on QuantumLink. His handle is SteveV14. □

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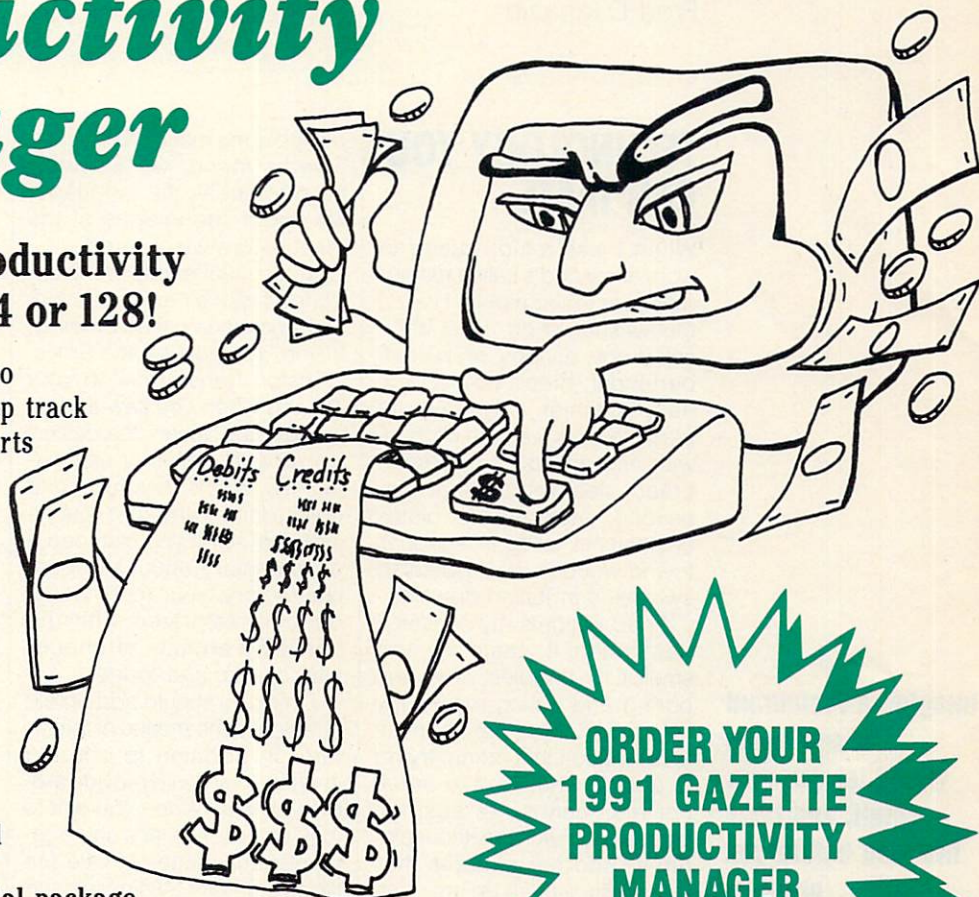
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D'IVERSIONS

Fred D'Ignazio

TECHNOLOGY YOU CAN TASTE

When I was a kid, I used to work at my dad's Italian restaurant near Philadelphia. I was a dishwasher, short-order chef, salad boy, busboy, prep chef, bartender, bread boy, and finally cashier. My favorite place to work was the kitchen, with its baskets of hot garlic bread, steaming cups of minestrone, pasta fagioli, plates of manicotti, lasagna, spaghetti, and wooden bowls of salad swimming in Italian dressing.

Food delights my senses. I can touch it, taste it, and smell it. I'm happiest when preparing and eating meals. My unhappiest times are when my face is stuck in a menu, trying to decide what food to order. For me, menus are abstract places full of words without pictures. And the pictures that the words conjure up are often confusing, fuzzy, and wrong.

What I'd like to see is a new kind of menu—a multimedia menu with digital sounds, pictures, and movies. The menu would be a computer touchscreen, with tiny meal icons and their accompanying names. You could place your finger over an icon, and the meal window would expand to fill the screen.

You could see animations that would rotate in three-dimensional space, photographs and drawings, and full-motion videos of your meal's being created. There would even be stereo sound of its being prepared and cooked.

What I'm talking about is a full-blown WYSIWYG menu: What You See on the menu Is What You Gobble when your meal arrives. A meal with no unpleasant surprises.

This would be a boon for us lowbrows who find ourselves in Chinese, Italian, Greek, or French restaurants unable to

decipher the menu. With a multimedia menu, we wouldn't have to speak the language; we could see images of the meal before we ordered.

In the 1950s kids were entranced with a new technological innovation called Smell-O-Vision. You hooked the Smell-O-Vision transformer to your TV, and when you saw a movie about the ocean, the device would waft smells of salt water, fish, clams, seagulls, and drying driftwood across your living room. Or if you watched a documentary about a chocolate factory, your room would become saturated with the heavenly aromas of chocolate, cocoa, and fudge.

I think we should add Smell-O-Vision to the menus of the future. In addition to offering images, they could provide aromas as well. When you ask to look at a meal—let's say eggplant parmigiana—a little fan on the Smell-O-Vision device would blow the scent of the meal your way. As you see colorful animated images of your meal, you could sample its delightful aromas as well.

After multimedia menus and Smell-O-Vision menus became old hat, it would be time to introduce yet another innovation, virtual reality menus. When customers sit down in a restaurant, they could open a drawer in their table and take out a pair of menu "reading glasses," which would be tiny stereoscopic computer monitors, and a "Touch-N-Feel" power glove. They could slip on the glove and the glasses and immediately see a door with the word *kitchen* above it. Customers would be in a virtual reality restaurant!

They could point at the door and feel themselves floating into the kitchen. They could fly up and down aisles in the virtual kitchen and point at the meals being prepared. If they point at a meal, it

zooms to life-size. Customers could pick up the plate, rotate it, smell it, and even touch it for freshness and texture.

For the ultimately picky customer, even the glove and the glasses may not be enough. For these people restaurants would offer a third sensor—a small wad of plastic that has the consistency of chewing gum. Actually the "gum" would be a cleverly disguised disposable composite of timed-release particles. Controlled by the computer, it would release a taste that matched the food item that the customer was previewing.

The gum would also conceal an ingeniously sensitive strain gauge, a device used to measure the pressure of the customer's teeth as he or she chewed on the plastic sensor. If the customer chewed a virtual slab of steak, the gum would become rigid and take on the consistency of steak; if the customer ate tender flakes of broiled flounder, the gum would simulate the softness of fresh fish.

After customers sampled several items by previewing their virtual counterparts, they could place an order by signaling the virtual cashier in the virtual kitchen. Voilà! Within minutes a real meal would be on its way to the customer's real table and real tummy.

The whole system could become so advanced that virtual meals might replace real meals. Dining out could become so virtually realistic that preparing real food would become unnecessary.

People who have tight budgets would appreciate this innovation. Virtual meals would be cheap! Also, a virtual meal that featured 12 courses of the most sinful yet scrumptious delights would be calorie free. Dieters and weight-loss maniacs would flock to restaurants that feature "lite" virtual cuisine. □

Imagine a restaurant whose menu would let you see, smell, and taste the food before you ordered.

BEGINNER BASIC

Larry Cotton

TRIM A TREE WITH RND

Happy holidays! We'll continue our investigation of random numbers and RND this month by writing a short program that keeps the seasonal spirit.

The 64's screen (or the 128's in the 64 mode) consists of 40 vertical columns by 25 horizontal rows. Each column or row is one character wide and one character tall. Therefore, there are 1000 (40 x 25) locations for characters on the screen. Carefully enter the following in immediate mode and then press Return:

```
POKE1024,42:POKE1024+54272,1
```

You should now see a white asterisk pop into the upper left corner of your television or monitor screen. Now try this:

```
POKE2023,42:POKE2023+54272,1
```

This should light up an asterisk in the lower right corner of the screen. Memory registers 1024 and 2023 correspond to the first and last locations on the screen.

The second POKE ensures that the character gets a color—in this case white. For each screen memory register from 1024 to 2023, there is a corresponding color memory register (from 55296 to 56295) which controls the color of the character at that particular location. Both the memory register and its corresponding color memory register are offset by 54272.

The characters that can be poked to the screen have the same appearance as the ones which can be printed but may use different codes. For instance, to print a white asterisk on the screen requires PRINT CHR\$(5) CHR\$(42) or POKE1024,42: POKE1024+54272,1.

To get a green inverted T symbol to appear in the same spot, however, one would have to use either PRINT CHR\$(30) CHR\$(177) or POKE 1024,113: POKE 1024+54272,5. (Note that when printing characters on a screen, the color must come first; the order doesn't matter when poking characters.)

Screen Display Codes and CHR\$(ASCII) codes for the 64 and 128 are published in separate appendices in the appropriate *User's Guide* or *Programmer's Reference Guide*. Another appendix contains screen and color memory register charts.

Now, let's begin the program. We'll illustrate how RND is useful in creating a graphic display—a twinkling Christmas tree. I will concentrate my explanations in this lesson on lines that pertain to the RND statement or to screen codes.

```
10 DIML(121)
20 PRINTCHR$(147)
30 POKE53280,0:POKE53281,0
40 C=54272:CH=42:Y=1
50 FOR=0TO14:READL
60 FORJ=0TOT:L=L+1:GOSUB150
70 NEXT:NEXT
```

Notice the 42 in line 40; that's our screen code for the asterisk. The color is the variable Y. We've set up two nested FOR-NEXT loops to read in the screen memory registers. Let's skip ahead to the data lines and the subroutine:

```
130 DATA 1203,1242,1282,1321,
1361,1400,1440,1479,1519,1558,
1598,1637,1677,1716
140 DATA 1756,1804
```

The above memory registers correspond to the screen locations of the Christmas tree's left edge. The rest of the tree is drawn by poking locations offset from these.

If you want to poke some

other picture to the screen, you can plot screen positions on a chart like the ones shown in the *Guide's* Screen and Color Memory Map Appendices. Trial and error often serve as well.

```
150 POKEL,CH:POKEL+C,Y
160 K=K+1:L(K)=L
170 RETURN
```

Line 150 pokes an asterisk CH to screen location L and color memory register L + C (C is the color offset 54272) in color Y. At the same time, we fill a one-dimensional array L(1) to L(120) with all the memory registers which are used to draw the tree. You'll see why in a minute. Now, let's go back to the program.

One more character, a green inverted T symbol (the Christmas tree stand), needs to be poked to the screen.

```
80 READL:CH=113:Y=5:GOSUB150
```

Run the program at this point. You should see a white asterisk-studded Christmas tree perched on a rather small stand. Now, let's make the lights twinkle. Here's where RND comes in.

```
90 K=INT(120*RND(1))+1
100 CO=INT(14*RND(1))+1
110 POKEL(K)+C,CO
120 GOT090
```

We want to paint the asterisks with randomly chosen colors. Lines 90 and 100 pick random numbers from 1 to 120 and from 1 to 14 respectively. The first is the index to the array we loaded in line 160; the second is the color itself. Line 110 pokes the random screen location with random color. Line 120 causes the program to loop indefinitely, giving the tree the appearance of being filled with dozens of colored twinkling lights.

Merry Christmas!

Poke random numbers to your TV or monitor screen to create a colorful holiday decoration.

PROGRAMMER'S PAGE

Randy Thompson

MULTILINGUAL COMPUTERS

Ask several Commodore 64 and 128 programmers what computer language they use the most, and you're likely to get only two distinct answers: BASIC and machine language. Broaden your poll to include Amiga, Macintosh, and MS-DOS programmers, and suddenly the range of answers fills a page.

Much of the Amiga's operating system was written in C. Combine this with the fact that there are two excellent C compilers available for that computer, and it's not too surprising to discover that most Amiga hackers prefer to work in C.

While the Amiga favors C, the Macintosh prefers Pascal. The Macintosh's Toolbox (a set of routines similar to the 64's ROM Kernal) was originally written in Pascal. As a result, Pascal would probably lead your Macintosh poll, with C and then assembly language following closely behind.

BASIC still has a strong grip on MS-DOS machines. It would undoubtedly top the IBM PC programming poll. And even though the number of available languages is quite large on MS-DOS computers, C would place a strong second. Pascal and machine language would come in third, with FORTRAN, COBOL, and a slew of other ancient dialects filling the list.

If you don't mind adding another page to your poll, you might take authoring languages as an acceptable answer. Authoring languages differ from traditional programming languages (you get more done through mouse clicks than you do with keystrokes), but the results can be quite similar. And it's authoring programs like *HyperCard* and *AmigaVision* that are to blame for

BASIC's decline in popularity on the Macintosh and Amiga, especially now that Amiga Basic won't run on newer Amigas and *AmigaVision* ships free with each Amiga sold.

Learning a new computer language can be fun and exciting—and you don't need to buy a new computer to do it. Abacus sells 64 and 128 versions of COBOL and C, a 64-only version of FORTRAN, and a 128-only version of Pascal. (All of these can be ordered from the mail-order company Software Support International.) While somewhat limited, these versions are a way to experiment with some of the languages that dominate much of the computing world.

C is the hottest computer language right now, and it's one of my personal favorites. It has several BASIC-like commands, but its structure is different. For example, take a simple FOR loop that prints the numbers from 1 to 10:

```
for ( i=1; i<11; i++ )
{printf( "The number is %d\n",
i );}
```

All arguments in a FOR command must be enclosed in parentheses. You may also note the lack of a NEXT instruction. The end of the FOR loop is denoted by the final curly brace. The first curly brace defines the start of the loop.

Within the parentheses you'll find three items, each separated by a semicolon. The first is an instruction that you want the computer to execute before it enters the loop for the first time. In this case, we assign the value 1 to the variable *i*. The second item specifies a condition that must remain true in order for the loop to repeat (*i* must be less than 11). The loop ends when this test condition proves false. The third item in parentheses is an instruction

that the computer executes after every pass through the loop. While we could have used a more familiar looking *i=i+1* instruction, the command *i++* is shorter and does the same thing. Of course, *i+=1* would also work.

The print command for C is *printf*. It looks strange but it's flexible. It's a supercharged PRINT USING command. In our FOR loop, the *%d* specifies that we want to print a decimal number at that location in the print string. The value we want to print follows the print string. The *\n* is *printf*'s code for a carriage return. To leave it out would be like adding a semicolon to the end of a PRINT string in BASIC.

Pascal is much more like BASIC than C. For example, a FOR loop in Pascal would look like this:

```
for i:=1 to 10 do begin
  writeln('The number is ', i);
end;
```

In Pascal, you precede an equal sign with a colon when assigning a value to a variable. The only time you drop the colon is when you test a variable's value, as in *if i=10*. The loop instructions are braced by the statements *begin* and *end*. And instead of a PRINT command, Pascal uses *writeln*. To print something without forcing a carriage return, use the shorter version, *write*. The optional *ln* stands for linefeed. Both Pascal and C use the semicolon to mark the end of an instruction.

If you'd like to experiment with a new language, stop by your library or bookstore and pick up a book on the topic.

Due to a printing error, the listing for Flood in last month's "Programmer's Page" was omitted. You can find it in this issue on page G-38. □

**Learning a new
computer
language can be
fun—and
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computer to do it.**

128 CONFIGURATION AID

Bruce M. Bowden

A major concern of 128 programmers, particularly when writing machine language routines, is how to configure the various memory banking arrangements. Wrong banking can leave critical RAM or ROM routines unavailable. The 128 has a configuration register within its memory management unit for doing banking. This program, *128 Configuration Aid*, makes calculating the configuration register value quick and easy.

Banking on the 128

The 128 uses two 64K RAM areas, a 28K BASIC interpreter, a 4K machine language monitor, a 4K screen editor, an 8K Kernal, 4K of character patterns, and another 4K for hardware chip registers. In addition, the 128 can also support 64K of cartridge ROM and another 128K of expanded memory. Although the 128 is capable of dealing with 372K of address space, the 8502 microprocessor can directly access only 64K at a time. How does the 128 do it?

The answer is banking. This means that only portions (up to 64K) of the entire arrangement are available to the microprocessor at any one time. The actual portions seen by the 8502 are coded by the value which resides in the configuration register at address 65280 (\$FF00). The value in this register has a specific pattern of eight bits, with different bits corresponding to special features of the configuration.

Bit 0 decides whether the input/output (I/O) block, RAM, or ROM will be in place from 53248 to 57343 (\$D000 to \$DFFF). Bit 1 decides whether low BASIC ROM or RAM resides at 16384-32767 (\$4000-\$7FFF). Bits 2 and 3 determine whether BASIC and ML monitor ROM, internal cartridge ROM, or external cartridge ROM or RAM appears at memory locations 32768-49151 (\$8000-\$BFFF).

Bits 4 and 5 determine whether Kernal and character ROM, internal cartridge ROM, external cartridge ROM, or RAM appears in the range 49152-65535 (\$C000-\$FFFF). Bits 6 and 7 determine which RAM block is in use, ranging in number from 0 to 3.

The program will calculate the combination of bits required for the kind of arrangement you need and present the result in decimal, hexadecimal, and binary notation. This number can then be poked into the configuration register found at 65280 (\$FF00).

Typing It In

Written entirely in BASIC, *128 Configuration Aid* should be entered with *The Automatic Proofreader*. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program to disk before you run it.

Calculate Configuration

The program runs in either 40- or 80-column mode. You'll first be asked if you want the output sent to your printer. Press Y or N according to your preference. You'll then be presented with the option of either calculating the configuration register value based on the most suitable banking arrangement or displaying the banking arrangement based upon a specific configuration register value. For purposes of demonstration, let's choose the first option by pressing the A key.

Let's say we want to run a machine language program which resides in RAM 1 and uses the Kernal routines and I/O, but not BASIC or the character set. The first query is where to get RAM. Unless your system setup has had some very special custom work done to it, options C and D are meaningless, so let's select B for RAM 1.

Next we need to decide how the region from 49152 to 65535 (\$C000 to \$FFFF) is banked. This is where Kernal ROM resides, so we need to press A to choose system ROM.

We must next make a choice of how to use the address space from 32768 to 49151 (\$8000 to \$BFFF). Because we don't need BASIC, which is choice A on the current screen, three choices remain. Let's just go with RAM, by pressing key D.

Similarly, the range 16384-32767 (\$4000-\$7FFF), excluding BASIC, leaves B as our choice on the next screen. Press the B key.

Finally, at addresses 53248-57343 (\$D000-\$DFFF), we need to keep I/O in place, so select option A.

The report shows that, in order to

achieve the configuration we want, a decimal value of 78 (1001110 in binary or 4E in hexadecimal) must be placed in the configuration register found at 65280 (\$FF00).

Display Configuration

Let's check out the other option. Run the program again, and this time choose option B. This will display the configuration which results from a specific value. If you enter 78, you should see the configuration just selected.

For another example, suppose we input a value of 234. We'd discover that we're using the high part of expansion RAM and the entire address space of external cartridge ROM, that BASIC isn't engaged, and that the character ROM is knocked out. This arrangement corresponds to using the command BANK 11 from BASIC 7.0.

If you program in machine language, give *128 Configuration Aid* a try. It greatly simplifies the task of managing the 128's possibilities.

128 CONFIGURATION AID

```
GD 10 REM COPYRIGHT 1991 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
PB 20 COLOR 6,1:FAST:PRINT CHR
    $(14)CHR$(147)CHR$(17)CH
    R$(17):RESTORE 120:FOR X
    =1 TO 5:READ NB(X):NEXT:
    DIM BE(15,2)
MM 30 FOR X=1 TO 4:READ BYTES(
    X):NEXT:FOR X=1 TO 5:FOR
    Y=1 TO NB(X)+1:READ BMB
    $(X,Y):NEXT:NEXT:FOR X=0
    TO 15:READ BE(X,1):READ
    BE(X,2):NEXT
QH 40 PR=50:MS="THE COMMODORE
    {SPACE}128 CONFIGURATION
    AID":GOSUB 540
QR 50 MS="COPYRIGHT 1991":GOSU
    B 540:MS="COMPUTE PUBLIC
    ATIONS INTERNATIONAL, LT
    D.":GOSUB 540
FJ 60 MS="ALL RIGHTS RESERVED"
    :GOSUB 540:PRINT:PRINT
SC 70 PRINT:PRINT:MS="USE COMM
    ODORE PRINTER ROUTINE? (
    Y OR N)":GOSUB 540
PC 80 GETKEY MS:PRINT CHR$(147
    )CHR$(17)CHR$(17):IF MS=
    "Y" THEN PR=33:OPEN 3,4,7
PH 90 MS="PLEASE SELECT FROM T
    HE OPTIONS BELOW":GOSUB
    {SPACE}550:PRINT:PRINT:M
    S="(A) CALCULATE CONFIGU
    RATION REGISTER VALUE":G
    OSUB 550
```



```

XG 100 MS="(B) DISPLAY CONFIGURATION FROM CONFIGURATION REGISTER VALUE":GOSUB 550:BIT$="":GOSUB 300:X=VAL(BIT$)+1:BIT$="":ON X GOTO 220,390
PH 110 :
CB 120 DATA 4,4,4,2,2,"00","01","10","11","$0000 TO $FFFF","RAM 0 (NORMALLY {SPACE}USED FOR PROGRAM S)"
PX 130 DATA "RAM 1 (NORMALLY USED FOR BASIC VARIABLE {SPACE}STORAGE)","FUTURE EXPANSION RAM LOW","FUTURE EXPANSION RAM HIGH"
HR 140 DATA"$0000 TO $FFFF","SYSTEM ROM","HIGH INTERNAL (USER EPROM) ROM","HIGH EXTERNAL (CARTRIDGE) ROM","EXPOSED RAM"
BF 150 DATA"$8000 TO $BFFF","SYSTEM ROM","MID INTERNAL (USER EPROM) ROM","MID EXTERNAL (CARTRIDGE) {SPACE}ROM","EXPOSED RAM"
HC 160 DATA"$4000 TO $7FFF","SYSTEM ROM","EXPOSED RAM"
FB 170 DATA"$D000 TO $DFFF","I/O DEVICES","CHARACTER {SPACE}GENERATOR ROM OR RAM"
CG 180 DATA 0,63,1,127,2,191,3,255,4,22,5,86,6,150,7,214,8,42,9,106,10,170,11,234,12,6,13,10,14,1,15,0
PR 190 :
RJ 200 REM CALCULATE CONFIGURATION REGISTER VALUE
QR 210 :
EX 220 PRINT CHR$(147)CHR$(17)CHR$(17)CHR$(17)
MR 230 FOR XX=1 TO 5:MS="PLEASE INDICATE YOUR CHOICES BELOW":GOSUB 540:PRINT:MS="THE SPACE FROM "+BM$(XX,1)+" WILL CONTAIN":GOSUB 540:PRINT
EM 240 FOR YY=1 TO NB(XX):MS=CHR$(YY+192)+" "+BM$(X,X,YY+1):GOSUB 540:NEXT:PRINT:PRINT
QX 250 MS="WHICH WILL IT BE?":GOSUB 540:IF NB(XX)=4 THEN GOSUB 310:ELSE GOSUB 300
CK 260 NEXT:MS="THE VALUE TO BE PLACED IN THE":GOSUB {SPACE}540:MS="MEMORY MANAGEMENT UNIT CONFIGURATION REGISTER (MMU CR) IS":GOSUB 540:PRINT:PRINT
HS 270 DC=0:MS="BINARY VALUE = "+BIT$:GOSUB 540:FOR X=0 TO 7:DC=DC+INT(VAL(MID$(BIT$,8-X,1))*2^X+.5):NEXT:PRINT:MS="DECIMAL VALUE = "+STR$(DC):GOSUB 540:PRINT
DP 280 MS="HEXADECIMAL VALUE = "+HEX$(DC):GOSUB 540:GOTO 480
RD 290 :
RS 300 CS="B":GOSUB 330:BIT$=BIT$+RIGHT$(STR$(XZ),1):GOTO 320
QP 310 CS="D":GOSUB 330:XZ=XZ+1:BIT$=BIT$+BYTES(XZ)
JJ 320 PRINT CHR$(147)CHR$(17)CHR$(17)CHR$(17):RETURN
BS 330 GETKEY AS:IFA$<"A" OR A$>C$ THEN 330:ELSE XZ=ASC(A$)-65
CP 340 IF PR=33 THEN MS="*****":MS=MS+"{2 SPACES}"+"A$+"{2 SPACES}"+MS:GOSUB 540
PQ 350 RETURN
QH 360 :
FA 370 REM CONFIGURATION FROM {SPACE}REGISTER VALUE
EK 380 :
XG 390 PRINT CHR$(147)CHR$(17):MS="PLEASE ENTER THE VALUE HELD IN THE CONFIGURATION REGISTER":GOSUB 540
CB 400 MS="(USE A "+CHR$(34)+" "+CHR$(34)+" IN FRONT {SPACE}OF A HEXIDECIMAL ENTRY.)"
RJ 410 GOSUB 540:PRINT:PRINT:INPUT AS:PRINT CHR$(147)CHR$(17):MS="USING THE {SPACE}VALUE "+A$:GOSUB 540:PRINT
DR 420 IF LEFT$(A$,1)="$" THEN DC=DEC(RIGHT$(A$,LEN(A$)-1)):ELSE DC=VAL(A$)
RH 430 DM=DC:BIT$="":DO UNTIL {SPACE}DM=0:DL=INT(DM/2):A$=STR$(2*(DM/2-DL)):BIT$=RIGHT$(A$,LEN(A$)-1)+BIT$:DM=DL:LOOP
DG 440 ZR$="00000000":IF LEN(BIT$)>8 THEN BIT$=RIGHT$(BIT$,8):ELSE IF LEN(BIT$)<8 THEN BIT$=LEFT$(ZR$,8-LEN(BIT$))+BIT$
RG 450 FOR XX=1 TO 5 STEP 2:YX=(1+XX)/2:A$=MID$(BIT$,XX,2):YY=1:DO UNTIL BYTES(YY)=A$:YY=YY+1:LOOP:MS="THE SPACE FROM "+BM$(YX,1)+"":GOSUB 540
DQ 460 MS=BM$(YX,YY+1):GOSUB {SPACE}540:PRINT:NEXT:FOR XX=7 TO 8:YX=XX-3:A$=MID$(BIT$,XX,1):YY=VAL(A$)+1:MS="THE SPACE FROM "+BM$(YX,1)+"":GOSUB 540
BK 470 MS=BM$(YX,YY+1):GOSUB {SPACE}540:PRINT:NEXT
JM 480 FOR X=0 TO 15:IF DC=BE(X,2) THEN MS="THIS CORRESPONDS TO BANK"+STR$(BE(X,1)):GOSUB 540
QG 490 NEXT:PRINT CHR$(27)+"G"+CHR$(7)
GX 500 IF PR=33 THEN PRINT#3:CLOSE3
AF 510 END
RB 520 :
SC 530 REM MESSAGE CENTERING ROUTINE
CF 540 IF PR=33 THEN LN=80:MS=MS:GOSUB 590:PRINT#3,MS:MS=MY$
GM 550 IF PEEK(215)=0 THEN BEGIN
JC 560 LN=40:SLOW:GOSUB 600:MS=MY$:GOSUB 590:PRINTMS
FE 570 IF MZ$<>" " THEN MS=MZ$:GOSUB 590:PRINTMS:RETURN
RK 580 BEND:ELSE LN=80:GOSUB 590:PRINTMS:RETURN
XJ 590 Y=INT((LN-LEN(MS))/2):FOR X=1 TO Y:MS=" "+MS:NEXT:RETURN
XG 600 IF LEN(MS)<40 THEN MY$=MS:MZ$=" ":RETURN
XQ 610 X=36
EQ 620 IF MID$(MS,X,1)=" " THEN MY$=LEFT$(MS,X-1):MZ$=RIGHT$(MS,LEN(MS)-X):RETURN:ELSE X=X-1:GOTO 620
FR 630 IF MS="" THEN RETURN:ELSE PRINTMS:RETURN

```

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DESDEMONA

Matt Morgan

Desdemona, also known as Othello or Reversi, is a popular strategy board game that uses black and white markers or disks. Its rules are simple, but its many possibilities of play make it challenging and complex. This sophisticated version features sound effects, sprites, and redefined multicolor characters.

Desdemona is written in BASIC. To avoid typing mistakes, use *The Automatic Proofreader* to type it in. See "Typing Aids" elsewhere in this section. When you've finished, save the program to disk before you run it.

Black and White

When you run *Desdemona*, the title screen appears, and then the program asks for the number of players—0, 1, and 2 are accepted values. Entering a 0 causes the computer to play itself; this mode is useful when you're learning the rules of the game and want to see a demonstration.

The main screen shows an 8 x 8 game board with four playing pieces (two black disks and two white ones) arranged symmetrically at the center. If you are playing against the computer (one-player mode), you have the white pieces and the 64 plays black.

Players alternate turns placing pieces on the board until every square is filled or neither player can make a move. If you cannot make a legal move, you must pass your turn to your opponent. Press P to do so.

The object of *Desdemona* is to have more pieces on the board at the end of the game than your opponent does. Each player has a box on the screen that shows the number of pieces he or she currently has in play. White's box is on the left; black's is on the right. A flashing check mark in one of the boxes shows whose turn it is.

When it's your turn, a blue square appears on one of the board's squares. To make a move, use the joystick in port 1 (port 2 for player 2) to move the square to the spot where you wish to place a piece and then press the fire button. If the move is illegal, the computer will buzz, and you will have to select another square. You may quit the game at any time by pressing Q.

To make a legal move, you must place your piece so that one or more of your opponent's pieces lie in a straight line between your new piece and another of your pieces. When you enclose your opponent's pieces, the computer will beep, and the enclosed pieces will change to your color. You may enclose pieces in any direction (up, down, left, right, or diagonally), and you can make multiple enclosures with one play. Scores can change dramatically with careful play. You may want to watch the computer play itself a few times to get the hang of it.

At the end of the game, the winner is announced, and you are asked if you want to play again.

Strategy

The computer makes a good opponent, but an experienced player can beat it rather easily. Why? Because the computer uses no strategy; it just chooses the move that will get the most pieces. The best move is not necessarily the one that wins the most pieces.

A good *Desdemona* player goes after the corner squares because they can't be changed. Corner pieces are the most valuable spots on the board. Edge squares are next in importance. They can only be changed in one direction, and they are unchangeable if connected by a row of your pieces to a corner square that you occupy.

DESDEMONA

```
PK 10 POKE56,140:CLR:DIMGB(9,9)
      ,DX(7),DY(7),P(7)
KF 20 DEF FN PS(C)=55221+3*X+1
      20*Y
CS 30 DEF FN XS(X)=61+X*24
HS 40 DEF FN YS(Y)=31+Y*24
PP 50 POKE53281,3:POKE53280,6
ER 60 POKE53280,6:PRINTCHR$(14
      2)"{CLR}{WHT}{4 DOWN}";
EK 65 PRINTTAB(5)"{A}CCI
EA 70 PRINTTAB(5)"B{K}B
      {8 SPACES}B
RB 80 PRINTTAB(5)"B{K}BUCIUCI
      UCBUCIUIUCIUIUCI
MX 90 PRINTTAB(5)"B{K}B BBCKJCI
      B BBCKBBBB BBBB B
AJ 95 PRINTTAB(5)"{Z}{CCKJCKJCK
      JCKJCKBBBBJCKBBJCI
MJ 110 PRINTTAB(12)"{BLU}{T}
      {Y}{U}{RVS}{I}{O}{Y}
      {6 U}{Y}{P}{O}{I}{OFF}
      {U}{Y}{T}"
RP 120 PRINTTAB(19)"{DOWN}
      {RED}BY MATT MORGAN
      {3 DOWN}"
MA 125 INPUT"{UP}
      {10 SHIFT-SPACE}HOW MAN
      Y PLAYERS{2 SPACES}1
      {3 LEFT}";AS:IFAS>"2"OR
      AS<"0"THEN 125
DX 130 POKE53270,PEEK(53270)OR
      16:POKE53282,7:POKE5328
      3,9:C=-1:GOSUB 850
QA 150 PL=VAL(AS)
AB 180 POKE53265,11:PRINT"
      {CLR}";:FORV=1TO25:A=35
      839+40*Y:POKEA,160:POKE
      A+19456,6:NEXT
AA 190 PRINTTAB(7)"{8}{OFF}{A}
      **{R}{R}{R}{R}{R}{R}**
      {R}{R}{R}{R}{R}{R}{S}":FOR
      T=1TO8:FORU=1TO2
PA 200 PRINTTAB(7)"-{2 SPACES}
      -{2 SPACES}-{2 SPACES}-
      {2 SPACES}-{2 SPACES}-
```

```
{2 SPACES}-{2 SPACES}-
{2 SPACES}-":NEXT
KX 210 PRINTTAB(7)"{Q}*****
      *****{W}";:IF
      T<>8THENPRINT
PB 220 NEXT:PRINT"{UP}":PRINTT
      AB(7)"{Z}{E}{E}{E}{E}
      {E}{E}{E}{E}{E}{E}{E}
      **{X}{HOME}"
DK 230 LS="{DOWN}{7 LEFT}":PRI
      NTWSS"{2 LEFT}{2 UP}
      {OFF}#{RVS}{5 SPACES}
      {OFF}%{LS}{RVS} WHITE "
      LS"{7 SPACES}LS{OFF}$
      {RVS}{5 SPACES}{OFF}&"
KC 240 PRINTBSS"{2 LEFT}{2 UP}
      {OFF}#{RVS}{5 SPACES}
      {OFF}%{LS}{RVS} BLACK "
      LS"{7 SPACES}LS{OFF}$
      {RVS}{5 SPACES}{OFF}&":
      POKE36203,122
AC 250 POKE36235,122:WS=0:BS=0
      :X=4:Y=4:C=1:GOSUB670:Y
      =5:C=0:GOSUB670
SG 260 X=5:C=1:GOSUB670:Y=4:C=
      0:GOSUB670:PT=1:POKE532
      65,27:SY=1
CR 270 PRINTWSSWS"{LEFT} "BS$B
      S"{LEFT} ":T=WS+BS:IF P
      T=1 THENPRINTWSS"{2 UP}
      {RIGHT}";:GOTO290
CH 280 PRINTBSS"{2 UP}{RIGHT}"
      ;
RA 290 IFT=640RT=WSORT=BSORFP=
      20RNT=2THEN560
GF 300 POKE647,PT:POKE204,0:IF
      (PT=0ANDPL=1)ORPL=0THEN
      POKEV+21,0:GOSUB490:GOT
      0450
BM 310 POKEV+21,1:J=56321:IFPT
      =0ANDPL=2THENJ=J-1
XH 320 GOTO420
KR 330 IF(PEEK(J)AND16)=0THEN4
      30
QD 340 AS="":GETAS:IFAS="P"THE
      NPF=1:GOSUB490:IFLLTHEN
      440
RH 350 IFAS="P"THEN450
XG 360 IFAS="Q"THENPOKEV+21,0:
      PRINT:FQ=1:GOTO470
HF 370 O=15-(PEEK(J)AND15):IFO
      =0THEN330
JG 380 IFO=1ANDSY>1THENSY=SY-1
PF 390 IFO=2ANDSY<8THENSY=SY+1
QJ 400 IFO=4ANDSX>1THENSX=SX-1
GF 410 IFO=8ANDSX<8THENSX=SX+1
GQ 420 POKEV,FN XS(SX):POKEV+1
      ,FN YS(SY):GOTO330
HH 430 X=SY:Y=SY:GOSUB740:IFLL
      THEN450
HR 440 POKESS+1,7:POKESS+4,33:
      FORQ=1TO500:NEXT:POKESS
      +4,0:GOTO330
KJ 450 POKESS+1,99:POKESS+4,17
      :FORQ=1TO99:NEXT:POKESS
      +4,0
EA 460 IFAS<>"P"THENNT=0:GOSUB
      820
```


PROGRAMS

```
SK 470 PT=1-PT:POKE204,1:POKE3
6203,122:POKE36235,122:
IFFQTHENFQ=0:GOTO620
ED 480 GOTO270
MA 490 BM=0:BX=0:BY=0:QP=2-PT:
A=9:FORX=1TO8:FORY=1TO8
:IFGB(X,Y)<>QPTHE540
BQ 500 Z=X:R=Y:FORQ=.TO7:X=Z+D
X(Q):Y=R+DY(Q):IFGB(X,Y
)ORX=AORY=AORX=.ORY=.TH
EN530
SJ 510 GOSUB740:IFTT>BMOR(TT=B
MANDRND(1)>.5)THENBM=TT
:BX=X:BY=Y
CA 520 IFLLANDPFTHE540:Z=A:R=
A:PF=.
HK 530 NEXT:X=Z:Y=R
GD 540 NEXT:NEXT:IFBM=0THENA$=
"P":LL=0:NT=NT+1:RETURN
KQ 550 A$="":X=BX:Y=BY:GOSUB74
0:RETURN
XM 560 POKEV+21,0:WN=1:IFBS>WS
THENWN=0
CH 570 IFBS=WS THENWN=2
ER 580 ON WN+1 GOSUB640,650,6
60
QA 590 PRINT{10 DOWN}ANOTHER
{DOWN}{6 LEFT}GAME?
{DOWN}{5 LEFT}{Y/N}"
CC 600 GETA$:IFA$<>"N"ANDA$<>"
Y"THEN600
XE 610 IFA$="N"THENSYS64738
GH 620 POKE49,PEEK(47):POKE50,
PEEK(48):DIMGB(9,9),DX(
7),DY(7),P(7)
JE 630 POKE65,DL:POKE66,DH:FOR
A=0TO7:READX(A),DY(A):
NEXT:GOTO10
DG 640 PRINT{HOME}{OFF}"TAB(3
3)"{2 DOWN}{BLK}BLACK
{2 DOWN}{5 LEFT}WINS!":
PRINTTAB(32):RETURN
MS 650 PRINT{HOME}{OFF}
{2 DOWN}{WHT}{RIGHT}WHI
TE{2 DOWN}{5 LEFT}WINS!
":RETURN
MA 660 PRINT{HOME}{OFF}
{2 DOWN}{RED}{3 RIGHT}A
{2 DOWN}{2 LEFT}TIE{UP}
{TAB(32)}"A{2 DOWN}
{2 LEFT}TIE":RETURN
JQ 670 A=FN PS(C):B=GB(X,Y)-1:
POKEA,C:POKEA+1,C:POKEA
+40,C:POKEA+41,C:A=A-19
456
BB 680 POKEA,35:POKEA+1,37:POK
EA+41,38:POKEA+40,36:GB
(X,Y)=C+1
DS 690 IFB=1THENWS=WS-1
FF 700 IFB=0THENBS=BS-1
GB 710 IFC=1THENWS=WS+1:GOTO73
0
QS 720 BS=BS+1
BF 730 RETURN
PE 740 TT=0:LL=0:IFGB(X,Y)THEN
RETURN
QC 750 P=PT+1:O=2:IFPTTHE540=PT
FQ 760 FORL=0TO7:P(L)=0:IFGB(X
```

```
+DX(L),Y+DY(L))<>OTHE540
10
JB 770 TX=X+DX(L):TY=Y+DY(L):C
O=0
RP 780 CO=CO+1:TX=TX+DX(L):TY=
TY+DY(L):IFGB(TX,TY)=0T
HEN810
FQ 790 IFGB(TX,TY)=PTHE540=1:P
(L)=CO:TT=TT+CO:GOTO810
AP 800 GOTO780
KJ 810 NEXT:RETURN
CH 820 QX=X:QY=Y:C=PT:GOSUB670
:FORL=0TO7:IFP(L)=0THEN
840
SK 830 X=QX:Y=QY:FORL=1TO7:P(L):
X=X+DX(L):Y=Y+DY(L):GOS
UB670:NEXT
RS 840 NEXT:RETURN
JF 850 PRINT{CLR}{N}{BLU}
{10 DOWN}"TAB(13)"PLEAS
E WAIT..."
AX 860 FOR X=0TO32:READ J:POKE
49152+X,J:NEXT:POKE5633
4,PEEK(56334)AND254
GF 870 POKE1,PEEK(1)AND251:SYS
49152:FORL=584TO607:POK
E40960+T,PEEK(53248+T):
NEXT
CB 880 FORL=680TO687:POKE40960
+T,PEEK(53248+T):NEXT:P
OKE1,PEEK(1)OR4
FH 890 POKE56334,PEEK(56334)OR
1:POKE56578,PEEK(56578)
OR3
MB 900 POKE648,140:PRINT{CLR}
{BLU}{10 DOWN}"TAB(13)"
PLEASE WAIT..."
BA 910 POKE56576,(PEEK(56576)A
ND252)OR1:POKE53272,56
KQ 920 FOR T=280TO311:READA:PO
KE40960+T,A:NEXT:FORL=4
3011TO43070:POKET,255:N
EXT
QP 930 FORL=43008TO43010:POKET
,0:NEXT:DN$="{DOWN}"RT
$="{RIGHT}":FORL=1TO6:D
N$=DN$+DN$:NEXT
QC 940 WSS="{HOME}"+"LEFT$(DN$,
11)+"{2 RIGHT}{RVS}
{WHT}":BS$="{HOME}"+"LEF
T$(DN$,12)+"{6 LEFT}
{RVS}{BLK}"
JK 950 Q=FRE(0)+RND(-TI/37):FO
RT=41936TO41943:POKET,2
55:NEXT:V=53248:POKEV+3
9,14
AE 960 POKEV+27,1:POKE36856,16
0:DL=PEEK(65):DH=PEEK(6
6):FORA=0TO7
SJ 970 READX(A),DY(A):NEXT:SS
=54272:FORL=SS+23:POK
ET,0:NEXT:POKESS+24,1
5
MJ 980 POKESS+5,15:POKESS+6,24
0:RETURN
BK 990 DATA 169,0,133,253,133,
251,169,216,133,252,169
,160,133,254,162,8,160,
```

```
0
EF 1000 DATA 177,251,145,253,1
36,208,249,230,252,230
,254,202,208,240,96,0,
3,15,31
BB 1010 DATA 63,127,127,255,25
5,127,127,63,31,15,3,0
,0,192,240,248,252,254
,254
GC 1020 DATA 255,255,254,254,2
52,248,240,192,0
DP 1030 DATA 0,-1,1,-1,1,0,1,1
,0,1,-1,1,-1,0,-1,-1
```

Matt Morgan attends college in Texas. His home is in New Plymouth, Idaho.

SCREEN DUMP 128

Bruce M. Bowden

Get a printout of your 128 text screens with this handy one-call utility. There aren't any fancy bells or whistles with this program. It does just one job, but *Screen Dump 128* works with both 80-column and 40-column screens. A simple SYS call is all it takes to activate.

Typing It In

Screen Dump 128 is written entirely in BASIC. To help avoid typing errors, use *The Automatic Proofreader* to enter it. See "Typing Aids" elsewhere in this section. Save a copy of the program before exiting *Proofreader*.

Dumping

Load and run *Screen Dump 128* as you would any BASIC program. The loader places machine code at address 4864 (\$1300). After the code is in place, you are then free to run any other BASIC program.

To obtain a copy of a directory or program listing, game results, or any text that appears on your screen, enter SYS 4864. This will dump the current 40- or 80-column screen to your Commodore-compatible printer.

SCREEN DUMP 128

```
GD 10 REM COPYRIGHT 1991 - COM
PUTE PUBLICATIONS INTL L
TD - ALL RIGHTS RESERVED
HE 20 REM "SCREEN DUMP LOADER
{SPACE}FOR THE COMMODORE
128"
PC 30 REM "THIS ROUTINE, ONCE
{SPACE}ACTIVATED, WILL D
UMP THE CURRENT"
```



```

RB 40 REM "SCREEN TO THE PRINT
ER (DEVICE 4). IT IS ACT
IVATED BY A SYS 4864."
SD 50 PRINTCHR$(147)CHR$(14)CH
R$(17)CHR$(17) "SETTING U
P..."
EJ 60 RESTORE130:Y=DEC("1300")
:IF PEEK(215) THEN FAST
HE 70 READB$:IF B$="EOF" THEN
{SPACE}SLOW:PRINT"A SYS
{SPACE}4864 WILL RUN THE
SCREEN DUMP":END
QA 80 IF LEFT$(B$,1)<>"@" THEN
120
RF 90 A$=B$:N=0:FOR X=0 TO 15:
READ B$:POKEY=X,DEC(B$):
N=N+DEC(B$):NEXT
XH 100 READB$:IF N<>VAL(B$) TH
EN 120
KJ 110 Y=Y+16:GOTO70
AM 120 PRINT"THESE IS A DATA E
RROR IN THE LINE BEGINN
ING WITH ";A$:END
JD 130 DATA @1,A5,D7,F0,03,4C,
3E,13,4C,0F,13,00,00,00
,00,00,A0,1050
MG 140 DATA @2,00,84,FB,A9,04,
85,FC,A0,27,B1,FB,99,76
,14,88,10,2011
FK 150 DATA @3,F8,A0,28,20,AB,
13,18,A5,FB,69,28,85,FB
,90,02,E6,2015
HJ 160 DATA @4,FC,A5,FC,C9,07,
D0,E0,A5,FB,C9,E8,D0,DA
,60,A9,00,2849
MC 170 DATA @5,8D,0E,13,A2,0C,
20,76,13,85,FC,E8,20,76
,13,85,FB,1687
SQ 180 DATA @6,A9,00,8D,0D,13,
20,8E,13,A5,FF,AC,0D,13
,99,76,14,1450
JC 190 DATA @7,EE,0D,13,C8,C0,
50,D0,ED,20,AB,13,EE,0E
,13,AD,0E,1867
AE 200 DATA @8,13,C9,19,90,DB,
60,8E,00,D6,2C,00,D6,10
,FB,AD,01,1759
EF 210 DATA @9,D6,60,8E,00,D6,
2C,00,D6,10,FB,8D,01,D6
,60,A2,12,1823
QM 220 DATA @A,A5,FC,20,82,13,
A5,FB,E8,20,82,13,A2,1F
,20,76,13,1789
QE 230 DATA @B,85,FF,E6,FB,A5,
FB,D0,02,E6,FC,60,88,B9
,76,14,C9,2733
RS 240 DATA @C,20,D0,03,88,D0,
F6,C8,A9,FF,99,76,14,A2
,00,8E,0A,2062
XR 250 DATA @D,13,8E,0B,13,A9,
00,8D,0C,13,AE,0A,13,BD
,76,14,C9,1263
XQ 260 DATA @E,FF,D0,03,4C,35,
14,C9,80,90,0C,C9,FE,B0
,08,A0,BB,2086
JP 270 DATA @F,8C,0C,13,18,29,
7F,C9,22,D0,02,A9,27,C9
,20,B0,06,1431

```

```

GJ 280 DATA @G,18,69,40,4C,01,
14,C9,41,90,07,C9,7F,B0
,03,18,69,1343
DC 290 DATA @H,80,AC,0C,13,C0,
BB,D0,1E,AE,0B,13,8D,0B
,13,A9,12,1510
JR 300 DATA @I,9D,C7,14,E8,AD,
0B,13,9D,C7,14,E8,A9,92
,9D,C7,14,2110
HB 310 DATA @J,8E,0B,13,4C,2C,
14,AE,0B,13,9D,C7,14,EE
,0A,13,EE,1397
AM 320 DATA @K,0B,13,4C,C4,13,
AE,0B,13,9D,C7,14,A9,00
,8D,0A,13,1240
CF 330 DATA @L,A9,03,A2,04,A0,
07,20,BA,FF,A9,00,20,BD
,FF,A9,00,1792
JX 340 DATA @M,A2,00,20,68,FF,
20,C0,FF,A2,03,20,C9,FF
,AE,0A,13,1888
PF 350 DATA @N,BD,C7,14,C9,FF,
F0,06,20,D2,FF,E8,D0,F3
,A9,0D,20,2504
AC 360 DATA @O,D2,FF,20,CC,FF,
60,00,00,00,00,00,00,00
,00,00,00,1052
CH 370 DATA EOF

```

Bruce M. Bowden is a programmer at COMPUTE Publications. He lives in Greensboro, North Carolina.

CHECKER COMMAND

Michael Sedlezky

Checker Command is a solitaire strategy board game for the 64 that is similar to checkers. Instead of red and black disks as pieces, however, the program uses heavily-armed hoverjets. They are animated and have appropriate sound effects. This is not your grandfather's game. A joystick for port 2 is required.

Typing It In

Checker Command is written entirely in machine language, but loads and runs like a BASIC program. The program uses sprites, customized characters, and an interrupt timer. To enter it, use *MLX*, our machine language entry program; see "Typing Aids" elsewhere in this section. When *MLX* prompts, respond with the following values.

Starting address: 0801

Ending address: 1918

Be sure to save a copy of the program before you exit *MLX*.

Playing the Game

Checker Command rules are similar to those used in checkers, but with a few twists. There are two levels of difficulty to allow for training and for playing against a serious opponent. You'll find play at the advanced level is intense because the computer's only objective is to win, and it seldom strays from that path of action.

To start the game, load the program and type RUN. When the title screen appears, press the space bar if you wish to play the easy level or press the joystick fire button for the advanced version. Both versions follow the same rules, but the computer doesn't try as hard to beat you on the easy level.

You command a fleet of 12 yellow hoverjets, and your mission is stop the enemy from breaching your defenses. You want to move forward, capturing as many pieces as you can, while blocking the enemy's determined advance.

Playing the game is simple. Just follow the onscreen commands, and make your moves with your joystick. Place the square highlighter on the piece you wish to move and press the fire button. This action will make your game piece come to life. If you change your mind and select another piece, just highlight the same square and press the fire button again. The onscreen command will turn green if the move is a legal one. The computer will not allow any illegal moves.

Once you have selected a piece to move, you must set its destination. Highlight the target square and press the fire button. Pieces move diagonally forward one square at a time. If you encounter an enemy piece with an empty space on its other side, you don't just jump it as you would in checkers; you engage the enemy jet in battle. The 64 handles the action for you.

Unlike checkers, *Checker Command* allows only one jump per turn. Jumps are mandatory, though. If one of your pieces has the opportunity to jump an opponent and you elect not to, you'll be penalized by having your jet destroyed.

After you make a move, the 64 takes over. You must sit and bite your nails as it tries to outwit you. The computer is good. It never misses an opportunity to have a good fight, but it

PROGRAMS

avoids a conflict whenever possible by sticking to its main objective. That objective is your bottom row.

Your pieces move up the screen until they reach the top row; then they may attack in the opposite direction. They may move back down the board until they reach the bottom row, and then they switch to up again. A piece that can move down has an indicator dot in its center.

There are five game-ending scenarios. First, you win if all the enemy jets are destroyed or boxed in and unable to move. Likewise, you lose if all your jets are destroyed or are unable to move. Finally, the last—and most frustrating—ending is when just one of the enemy jets slips by your defenses and reaches the bottom row of the checkboard. This signifies a breach of your defenses and is the most humiliating way you can lose a game.

A timer is shown to see how long you can last against the master. An average game lasts between 10 and 15 minutes, but there is no time limit. The timer stops when the game ends. Lightly tap the fire button to restart the game if you wish to play again.

CHECKER COMAMND *command*

```
0801:0C 08 01 00 9E 20 33 31 46
0809:33 37 00 00 00 00 00 00
0811:00 00 00 00 00 00 00 21
0819:00 00 00 18 00 00 3C 00
0821:00 18 00 00 00 00 00 37
0829:00 00 00 00 00 00 00 39
0831:00 00 00 00 00 00 00 41
0839:00 00 00 00 00 00 07 57
0841:00 00 00 00 00 00 00 51
0849:00 00 00 00 00 00 00 6A
0851:40 02 6E 60 02 AE A0 02 E3
0859:AE A0 02 AA A0 02 AA A0 D6
0861:01 AA 90 00 66 40 00 00 E2
0869:00 00 00 00 00 00 00 79
0871:00 00 00 00 00 00 00 81
0879:00 00 00 00 00 00 47 00 18
0881:00 00 00 00 00 00 00 91
0889:00 00 00 00 08 00 00 08 E1
0891:00 00 6E 40 02 6E 60 02 FF
0899:AA A0 02 AA A0 02 AA A0 15
08A1:02 AA A0 02 AA A0 00 6A D3
08A9:40 00 04 00 00 00 00 5A
08B1:00 00 00 00 00 00 00 00 C1
08B9:00 00 00 00 00 00 47 00 58
08C1:00 00 00 00 00 00 08 00 E1
08C9:00 08 00 00 00 00 00 2E 4A
08D1:00 00 2E 00 00 6E 40 02 E3
08D9:AE A0 02 AA A0 0A AA A8 7F
08E1:0A AA A8 0A AA A8 01 A6 F7
08E9:90 00 04 00 00 00 00 C2
08F1:00 00 00 00 00 00 00 02
```

```
08F9:00 00 00 00 00 47 00 98
0901:00 00 00 00 00 00 00 A3
0909:00 00 00 00 2E 00 00 2E BC
0911:00 00 6E 40 00 6E 40 00 2F
0919:6E 40 02 AA A0 02 AA A0 60
0921:0A AA A8 0A A6 A8 05 A6 21
0929:94 00 04 00 00 00 00 06
0931:00 00 00 00 00 00 00 43
0939:00 00 00 00 00 47 00 D9
0941:00 00 00 00 00 00 00 53
0949:00 00 00 00 00 00 00 5B
0951:00 00 00 20 00 06 F0 02 65
0959:9B E0 0A AF 80 1A AE 40 B7
0961:1A AA 40 02 6A 80 01 6A 15
0969:80 01 AA 80 00 2A 00 00 02
0971:0A 00 00 05 00 00 00 00 D8
0979:00 00 00 00 00 47 00 1A
0981:00 00 00 00 00 00 00 93
0989:00 00 00 06 00 00 06 80 88
0991:00 0A 80 00 0A 94 00 0A E2
0999:A8 00 0A AA 80 16 AF E8 90
09A1:16 AF E8 0A AA 80 0A A8 7C
09A9:00 0A 94 00 0A 80 00 06 29
09B1:00 00 06 00 00 00 00 84
09B9:00 00 00 00 00 47 00 5A
09C1:00 00 00 00 00 00 00 D3
09C9:00 05 00 00 09 00 00 29 8E
09D1:00 00 2A 00 00 AA 00 01 D4
09D9:AA 00 01 6A 00 02 6A 40 25
09E1:0A AE 40 0A AF 80 1A AB AC
09E9:C0 1A 5A E0 04 10 A0 00 DD
09F1:00 00 00 00 00 00 00 06
09F9:00 00 00 00 00 47 00 9A
0A01:00 00 00 00 00 00 00 15
0A09:00 00 00 00 00 00 00 1D
0A11:00 00 04 00 05 A6 94 0A 9B
0A19:A6 A8 0A AA A8 02 AA A0 D9
0A21:02 AA A0 02 6E 60 00 6E 78
0A29:40 00 6E 40 00 2E 00 00 E7
0A31:2E 00 00 00 00 00 00 EC
0A39:00 00 00 00 00 47 00 DD
0A41:00 00 00 00 00 00 00 55
0A49:00 00 00 00 50 00 00 60 40
0A51:00 00 68 00 00 A8 00 00 15
0A59:AA 40 00 69 40 01 A9 80 43
0A61:01 BA A0 02 FA A8 03 EA 44
0A69:A9 03 AA A9 0A 96 04 08 BD
0A71:10 00 00 00 00 00 00 8D
0A79:00 00 00 00 00 47 00 1C
0A81:00 00 00 00 00 00 00 95
0A89:00 00 00 00 00 90 00 02 E1
0A91:90 00 02 A0 00 16 A0 00 D1
0A99:2A A0 02 AA A0 2B FA 94 12
0AA1:2B FA 94 02 AA A0 00 2A BE
0AA9:A0 00 16 A0 00 02 A0 00 24
0AB1:02 90 00 00 90 00 00 6F
0AB9:00 00 00 00 00 47 00 5C
0AC1:00 00 00 00 00 00 00 D5
0AC9:00 00 00 08 00 00 84 F6
0AD1:00 02 E9 A9 02 FA A9 02 8F
0AD9:BE A9 01 AE A8 00 6A 60 3D
0AE1:00 6A 50 00 2A 80 00 2A 18
0AE9:80 00 2A 00 00 2A 00 00 2C
0AF1:18 00 00 14 00 00 00 53
0AF9:00 00 00 00 00 47 00 9C
0B01:00 00 00 00 00 00 00 17
0B09:00 00 00 00 00 00 00 27
0B11:00 02 20 20 00 00 00 02 B0
0B19:3B 00 01 22 10 00 22 00 D3
0B21:08 A2 80 02 0E 00 01 20 A6
```

```
0B29:80 00 08 20 00 80 40 00 05
0B31:00 00 00 00 00 00 00 47
0B39:00 00 00 00 00 47 00 DD
0B41:00 00 00 00 00 20 80 18
0B49:00 00 08 02 08 00 00 E0 A1
0B51:08 08 00 C0 04 10 62 00 9E
0B59:04 04 02 15 00 10 04 42 8E
0B61:00 10 20 08 00 00 00 02 02
0B69:00 20 2C 08 04 00 00 00 AD
0B71:80 00 08 08 60 00 00 00 4C
0B79:00 00 00 00 00 00 47 22 40
0B81:00 20 00 01 02 03 60 88 15
0B89:84 08 40 20 80 32 14 05 E7
0B91:00 80 41 12 01 14 00 90 F9
0B99:41 04 04 41 10 20 14 00 0F
0BA1:00 41 04 04 01 02 01 10 EA
0BA9:04 84 00 40 00 0C 02 10 2B
0BB1:20 00 00 40 40 00 00 00 F5
0BB9:00 00 00 00 00 47 04 62
0BC1:00 60 80 44 02 00 00 10 64
0BC9:01 40 00 10 04 40 00 00 92
0BD1:00 00 00 10 00 00 00 10 F9
0BD9:28 04 04 00 00 00 00 85
0BE1:80 04 04 04 01 00 01 10 23
0BE9:04 04 00 40 80 00 00 10 1B
0BF1:00 00 00 40 40 00 00 00 0E
0BF9:00 00 02 00 20 00 47 00 DF
0C01:00 00 00 00 00 00 00 00 19
0C09:00 00 00 00 00 00 44 65
0C11:40 00 04 00 00 11 00 00 0E
0C19:04 00 00 40 40 00 04 00 41
0C21:00 00 00 00 00 00 00 39
0C29:00 00 00 00 00 00 00 41
0C31:00 00 00 00 00 00 00 49
0C39:00 00 00 00 00 47 00 DF
0C41:A9 FF 85 FE 85 FC 8D 15 1F
0C49:D0 A9 D2 85 FF A9 22 85 57
0C51:FD A0 00 8C 0E DC A9 33 C3
0C59:85 01 B1 FE 91 FC C6 FC A5
0C61:C6 FE D0 F6 C6 FD C6 FF E1
0C69:A5 FE C9 CF D0 EC A9 37 4F
0C71:85 01 A9 01 8D 0E DC A9 D9
0C79:18 8D 18 D0 A2 64 BD 1E 51
0C81:00 9D 07 21 CA D0 F7 A9 AD
0C89:93 20 D2 FF A9 0B 8D 20 82
0C91:D0 8D 21 D0 8D 35 CD 8D 11
0C99:36 CD A2 0F 8E 08 CD BD 73
0CA1:77 CD 9D 74 05 BD 87 0D EE
0CA9:9D EC 05 A9 07 9D 74 D9 78
0CB1:9D EC D9 A9 00 9D 00 08 28
0CB9:8D 00 CD 8D 09 CD 8D 0B D0
0CC1:CD 8D 26 D0 CA 1D 8D AD EB
0CC9:00 DC 29 10 F0 0F 20 E4 28
0CD1:FF C9 20 D0 F2 A9 01 8D 3B
0CD9:54 CD 4C E6 0C A9 00 8D 1C
0CE1:54 CD 20 DA 0D 20 D5 0E EB
0CE9:A9 E5 8D 1C D0 A9 09 8D 90
0CF1:25 D0 20 EE 0D A2 06 BD 80
0CF9:77 D0 9D 21 04 BD 7F 0D F9
0D01:9D 49 04 A9 00 9D 60 CD 5C
0D09:9D 21 D8 9D 49 D8 CA 10 82
0D11:E6 20 9C 13 20 9A 0F 20 15
0D19:DA 0D 4C 41 0C AA 55 AA E1
0D21:55 AA 55 AA 55 AA 55 AA 90
0D29:55 AA 55 AA 55 AA 55 AA 98
0D31:55 AA 55 AA 55 AA 00 1F 6A
0D39:3F 3F 3F 3F 1F 00 00 F8 90
0D41:FC FC FC FC 1F 00 00 1F 6F
0D49:3F 3F 3F 3F 1F 00 00 F8 A0
0D51:FC FC FC FC F8 00 00 1F 7F
```



```

0D59:3F 3E 3E 3F 1F 00 00 F8 50 0F89:03 8D 71 CD 78 A9 C9 8D 23 11B9:00 CB CD 39 CD D0 10 AD 9B
0D61:FC 7C 7C FC F8 00 00 1F 5F 0F91:14 03 A9 0F 8D 15 03 58 BF 11C1:09 CD C9 01 F0 09 AD 00 2C
0D69:3F 3E 3E 3F 1F 00 00 F8 60 0F99:60 78 AD 70 CD 8D 14 03 92 11C9:CD 18 69 EE 8D 04 CC AD B8
0D71:FC 7C 7C FC F8 00 03 08 5E 0FA1:AD 71 CD 8D 15 03 58 60 4B 11D1:09 CD C9 FE F0 25 AD 00 8C
0D79:05 03 0B 05 12 20 03 0F AE 0FA9:00 02 04 06 09 0B 0D 0F C6 11D9:CD 18 69 F9 8D 01 CC 8D 4D
0D81:0D 0D 01 0E 04 20 02 19 24 0FB1:10 12 14 16 29 2B 2D 2F BF 11E1:09 CC AA BD 00 CB CD 39 F0
0D89:20 0D 09 0B 05 20 13 05 9C 0FB9:30 32 34 36 39 3B 3D 3F D6 11E9:CD D0 10 AD 09 CD C9 02 19
0D91:04 0C 05 1A 0B 19 00 00 AF 0FC1:FF 01 00 00 00 00 02 FE 23 11F1:F0 09 AD 00 CD 18 69 F2 19
0D99:08 0A 07 07 0F 0F 07 07 55 0FC9:CE 1A 10 F0 03 6C 70 CD 5F 11F9:8D 05 CC AD 09 CD C9 FF AB
0DA1:0F 0F A2 06 B9 F9 10 9D 2F 0FD1:A9 3C 8D 1A 10 EE 64 CD F9 1201:F0 2D AD 00 CD 18 69 07 47
0DA9:61 05 B9 0E 11 9D 89 05 E4 0FD9:A2 03 BD 61 CD DD 16 10 F9 1209:C9 40 B0 23 8D 02 CC 8D 06
0DB1:A9 0F 9D 61 D9 9D 89 D9 60 0FE1:D0 08 A9 00 9D 61 CD FE AC 1211:0A CC AA BD 00 CB CD 39 A2
0DB9:88 CA 10 E8 60 A2 06 B9 AE 0FE9:60 CD CA 10 ED A0 01 B9 B3 1219:CD D0 14 AD 09 CD C9 01 C9
0DC1:23 11 9D 01 06 B9 4D 11 38 0FF1:61 CD 09 30 99 9A 04 A9 41 1221:F0 0D AD 00 CD 18 69 0E 66
0DC9:9D 29 06 AD 06 CD 9D 01 3C 0FF9:0F 99 A9 D8 99 D8 99 75 1229:C9 8D 00 B0 03 8D 06 CC AD 54
0DD1:DA 9D 29 DA 88 CA 10 E7 0B 1001:9C D8 B9 63 CD 09 30 99 9F 1231:09 CD C9 FE F0 2D AD 00 0E
0DD9:60 AD 00 DC 29 10 D0 F9 82 1009:9D 04 88 10 E2 A9 3A 8D CA 1239:CD 18 69 09 C9 40 B0 23 DB
0DE1:AD 00 DC 29 10 F0 F9 CE 08 1011:9C 04 6C 70 CD 0A 0A 06 C5 1241:8D 03 CC 8D 0B CC AA BD FD
0DE9:01 CD D0 FB 60 A9 74 85 E9 1019:0A 01 20 EE 0D AE 00 CD 62 1249:00 CB CD 39 CD D0 14 AD 35
0DF1:FF A9 00 85 FE A2 17 A9 29 1021:BD 80 CA 85 FF BD C0 CA 35 1251:09 CD C9 02 F0 0D AD 00 DD
0DF9:02 8D 02 CF A9 21 8D 01 A3 1029:85 FE A2 02 A0 03 A9 23 C7 1259:CD 18 69 12 C9 40 B0 03 6C
0E01:CF A0 1F A9 03 8D 00 CF C9 1031:91 FE 88 10 F9 A5 FE 18 68 1261:8D 07 CC AD 4A CD D0 29 D6
0E09:AD 01 CF 91 FE CE 00 CF 52 1039:69 28 85 FE A5 FF 69 00 B8 1269:AD 1C CD D0 05 AD 26 CD 2B
0E11:10 0D AD 01 CF 49 03 8D 75 1041:85 FF CA 10 E7 4C 45 0E 87 1271:F0 11 A9 FF 8D 00 CC 8D 1B
0E19:01 CF A9 03 8D 00 CF 88 A3 1049:20 E6 10 A0 06 20 A3 0D 44 1279:01 CC 8D 04 CC 8D 05 CC B6
0E21:10 E6 CE 02 CF 10 D0 A9 7B 1051:A0 06 20 BE 0D AD 00 DC 2F 1281:4C 92 12 A9 FF 8D 02 CC 54
0E29:02 8D 02 CF AD 01 CF 49 41 1059:29 10 D0 10 AE 00 CD 8E CC 1289:8D 03 CC 8D 06 CC 8D 07 2D
0E31:03 8D 01 CF A5 FE 18 69 12 1061:07 CD BD 00 CB C9 21 D0 C8 1291:CC 60 A9 3F 8D 31 CD A9 D3
0E39:28 85 FE A5 FF 69 00 85 30 1069:03 4C DA D0 20 8A 1D AE 44 1299:00 8D 32 CD AE 31 CD BD D7
0E41:FF CA 10 BD A9 3F 8D 0F 62 1071:00 CD BD 00 CB C9 21 F0 75 12A1:00 CB CD 33 CD D0 5F 8E A4
0E49:CD AE 0F CD BD 80 CA 85 C1 1079:08 A9 0F 8D 06 CD 4C 87 4A 12A9:00 CD BD 80 CB 8D 1C CD 9B
0E51:FF BD C0 CA 85 FE BD 00 45 1081:10 A9 0D 8D 06 CD 4C 4C DA 12B1:20 8B 11 A0 07 B9 00 CC 0E
0E59:CB F0 29 C9 21 F0 0F BD 02 1089:10 AD 00 DC 8D 02 CD AD A8 12B9:30 28 8D 34 CD AA BD 00 89
0E61:80 CB F0 05 A9 2A 4C 7B 29 1091:00 CD AE 00 CD BD C0 CB AD 12C1:CB D0 1A A9 01 8D 32 CD 4E
0E69:0E A9 26 4C 7B 0E BD 80 90 1099:AA AD 02 CD 29 04 D0 0A 9C 12C9:AD 34 CD 8D 30 CD AD 00 78
0E71:CB F0 05 A9 28 4C 7B 0E 62 10A1:E0 FF F0 39 CE 00 CD 4C 42 12D1:CD 8D 40 CD 98 29 03 8D 22
0E79:A9 24 A0 29 91 FE 18 69 3C 10A9:DE 10 AD 02 CD 29 08 D0 07 12D9:42 CD 4C E3 12 A9 FF 99 2B
0E81:01 C8 91 FE CE 0F CD 10 D0 10B1:0A E0 FE F0 06 EE 00 CD B7 12E1:00 CC 88 10 D0 A2 03 BD 20
0E89:C0 A9 00 85 FE 85 FC A9 7A 10B9:4C DE 10 AD 02 CD C9 7E ED 12E9:04 CC 30 17 8D 41 CD AD 75
0E91:04 85 FD A9 74 85 FF A9 CE 10C1:D0 0B AD 00 CD E9 08 8D 76 12F1:31 CD 8D 3F CD A9 01 8D 6C
0E99:17 8D 10 CF A0 1F B1 FE 87 10C9:00 CD 4C DE 10 AD 02 CD DD 12F9:3E CD 8E 43 CD BD 08 CC 38
0EA1:91 FC 29 0F AA A5 FD 85 49 10D1:29 02 0D 14 AD 00 CD 18 83 1301:8D 44 CD CA 10 E1 CE 31 C
0EA9:FA 18 69 D4 85 FD BD 97 FA 10D9:69 08 8D 00 CD AD 00 CD 55 1309:CD 10 91 60 A0 0D 20 BE 8A
0EB1:0D 91 FC A5 FA 85 FD 88 25 10E1:29 3F 8D 00 CD 20 1B 10 4D 1311:0D AD 00 DC 29 10 D0 4B 6D
0EB9:10 E4 A5 FE 18 69 28 85 F7 10E9:A9 14 8D 05 CD CE 04 CD 65 1319:AD 00 CD CD 12 CD F0 0A 60
0EC1:FE 85 FC A5 FD 69 00 85 D3 10F1:D0 FB CE 05 CD D0 F6 60 A3 1321:AD 06 CD C9 D0 F0 03 4C 74
0EC9:FD 18 69 70 85 FF CE 10 F8 10F9:20 19 0F 15 12 20 20 0D 02 1329:0D 13 AD 00 CD C9 08 B0 A6
0ED1:CF 10 C9 60 A9 07 8D 18 B5 1101:19 20 14 15 12 0E 07 01 63 1331:05 A9 01 8D 1C CD C9 38 21
0ED9:CD A9 36 8D 16 CD A9 74 96 1109:0D 05 20 09 13 03 0F 0D 57 1339:00 05 A9 00 8D 1C CD AE 45
0EE1:85 FF A0 00 84 FE A9 1B 63 1111:0D 01 0E 04 14 0F 20 0D 26 1341:00 CD AD 1C CD 9D 80 CB 04
0EE9:8D 17 CD A2 07 AD 16 CD 5F 1119:0F 16 05 20 0F 16 05 12 D7 1349:A9 00 8D 1D CD AD 11 CD DC
0EF1:99 00 CA AD 17 CD 99 40 72 1121:20 20 13 05 0C 05 03 14 9C 1351:C9 04 90 05 A9 01 8D 1D 49
0EF9:CA 18 69 20 8D 17 CD A5 BA 1129:20 13 05 0C 05 03 14 20 FD 1359:CD A0 14 A9 0E 8D 06 CD 2C
0F01:FE 99 C0 CA 18 69 04 85 BD 1131:10 0C 05 01 13 05 20 20 1C 1361:4C BE 0D 20 8A 10 A2 07 E1
0F09:FE A5 FF 99 80 CA 69 00 AB 1139:20 19 0F 15 20 20 09 20 98 1369:BD 00 CC CD 00 CD F0 0B 09
0F11:85 FF A9 00 99 00 CB 99 25 1141:08 01 16 05 20 0A 15 0D 1B 1371:CA 10 F5 A9 0F 8D 06 CD E2
0F19:40 CB 99 80 CB 99 C0 CB 97 1149:10 09 0E 07 06 09 07 08 52 1379:4C 0D 13 8E 11 CD AD 11 80
0F21:C8 CA 10 C9 AD 16 CD 18 6E 1151:14 05 12 14 01 12 07 05 A5 1381:CD 29 03 AA BD 08 CC 8D 19
0F29:69 18 8D 16 CD A5 FE 18 30 1159:14 20 13 14 01 0E 04 02 7B 1389:1E CD 00 AE 00 CD BD 00 CB 39
0F31:69 58 85 FE A5 FF 69 00 BA 1161:19 20 20 17 09 0E 04 20 6E 1391:D0 05 A9 0D 8D 06 CD 4C D3
0F39:85 FF CE 18 CD 10 A7 A2 16 1169:20 20 17 0F 0E 20 20 10 B8 1399:0D 13 00 A9 00 8D 26 CD F5
0F41:0B BD A9 0F A8 A9 25 99 4A 1171:05 0E 01 0C 14 19 20 7D 3D 13A1:8D 3E CD 8D 3B CD A9 01 16
0F49:00 CB A9 0F 99 40 CB BD A3 1179:11 4C 0D 13 AE 00 CD BD D8 13A9:8D 3C CD A9 21 8D 33 CD AD
0F51:B5 0F A8 A9 21 99 00 CB F8 1181:80 CB 8D 1C CD A9 00 9D FC 13B1:A9 25 8D 39 CD 20 93 12 63
0F59:A9 07 99 40 CB CA 10 E1 D0 1189:80 CB A2 07 A9 2F 9D 00 2C 13B9:AD 32 CD D0 03 4C 8B 14 7E
0F61:A2 07 BD C1 0F 9D C0 CB A2 1191:CC 9D 08 CC 8D 2D CD CA D6 13C1:AD 36 CD 30 F8 20 49 10 F3
0F69:9D C8 CB 9D D0 CB 9D D8 A5 1199:10 F2 AE 00 CD 8E 12 CD F0 13C9:20 23 16 20 EE 0D 20 99 13
0F71:CB 9D E0 CB 9D E8 CB 9D 7B 11A1:BD C0 CB 8D 09 CD C9 FF 38 13D1:16 20 77 11 AD 12 CD CD 2A
0F79:F0 CB 9D F8 CB CA 10 E2 D2 11A9:F0 25 AD 00 CD 18 69 F7 DC 13D9:00 CD D0 06 20 95 17 4C BF
0F81:AD 14 03 8D 70 CD AD 15 DF 11B1:8D 00 CC 8D 08 CC AA BD 93 13E1:C6 13 20 AD 14 AD 3E CD B0

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PROGRAMS

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13E9:F0 08 AD 3B CD D0 03 20 CB
13F1:7B 15 A0 0D 20 A3 0D A0 4A
13F9:14 A9 0E 8D 06 CD 20 BE 95
1401:0D A9 01 8D 26 CD A9 00 CE
1409:8D 3D CD 8D 3B CD 8D 3E 44
1411:CD A9 25 8D 33 CD A9 21 4D
1419:8D 39 CD 20 93 12 AD 32 84
1421:CD D0 03 4C 9B 14 AD 35 47
1429:CD 30 F8 AD 3E CD F0 2A 73
1431:8D 1D CD AD 43 CD 8D 11 79
1439:CD AD 3F CD 8D 00 CD 20 A0
1441:23 16 20 EE 0D 20 99 16 A5
1449:AD 41 CD 8D 00 CD AD 44 02
1451:CD 8D 1E CD 20 AD 14 4C 90
1459:81 14 4C BA 14 A9 00 8D 51
1461:1D CD AD 42 CD 8D 11 CD F9
1469:AD 40 CD 8D 00 CD 20 23 A5
1471:16 20 EE 0D 20 99 16 AD 9C
1479:30 CD 8D 00 CD 20 AD 14 3D
1481:AD 00 CD C9 38 B0 03 4C AD
1489:9C 13 A0 14 20 A3 0D A0 64
1491:22 A9 0A 8D 06 CD 20 BE B5
1499:0D 60 A0 14 20 A3 0D A0 FF
14A1:1B A9 0A 8D 06 CD 20 BE 42
14A9:0D 4C 9A 14 20 EC 17 20 03
14B1:EE 0D 20 65 17 20 EE 0D 13
14B9:60 AD 54 CD D0 48 A9 01 E0
14C1:8D 4A CD A9 3F 8D 50 CD 36
14C9:AE 50 CD BD 00 CB C9 25 DA
14D1:D0 2F 8E 00 CD 20 8B 11 17
14D9:A9 02 8D 42 CD AE 02 CC 27
14E1:8E 30 CD BD 00 CB F0 3B 3F
14E9:AE 50 CD 8E 00 CD 20 8B 23
14F1:11 A9 03 8D 42 CD AE 03 EF
14F9:CC 8E 30 CD BD 00 CB F0 85
1501:22 CE 50 CD 10 C2 A9 00 B5
1509:8D 4A CD 20 93 12 4C 5E 24
1511:14 AE 50 CD A9 25 9D 00 F4
1519:CB AD 42 CD C9 03 D0 C8 7E
1521:4C 02 15 AE 00 CD A9 00 0A
1529:9D 00 CB AD 30 CD 8D 00 4A
1531:CD 20 8B 11 AE 02 CC 30 14
1539:13 BD 00 CB F0 0E C9 25 91
1541:F0 0A AE 01 CC 30 05 BD 3B
1549:00 CB F0 C5 AE 03 CC 30 2C
1551:16 AE 03 CC BD 00 CB F0 D5
1559:0E C9 25 F0 0A AE 00 CC 88
1561:30 05 BD 00 CB F0 AA AE C2
1569:50 CD 8E 40 CD A9 25 9D 02
1571:00 CB A9 00 8D 4A CD 4C 41
1579:5E 14 20 0B 16 A9 41 8D F3
1581:0B D4 A9 12 8D 3E CD AE 6C
1589:3F CD BD 00 CB F0 03 8E 35
1591:00 CD AD 9A 0D 49 0D 8D C3
1599:9A 0D 8D 08 D4 8D 0A D4 4C
15A1:8D 06 CD A0 29 20 BE 0D 2C
15A9:20 1B 10 20 EE 0D CE 3E 36
15B1:CD D0 DF A9 40 8D 0B D4 B0
15B9:20 23 16 20 EE 0D 20 99 07
15C1:16 20 02 16 A9 FA 8D 0D 02
15C9:D4 8D 0C D4 A9 2C 8D F8 A2
15D1:07 8D F9 07 A9 30 8D 20 DB
15D9:CD A9 81 8D 0B D4 A9 00 5D
15E1:8D 17 D4 20 24 17 A9 01 07
15E9:8D 08 D4 A9 80 8D 0B D4 37
15F1:8D 04 D4 A9 00 8D 0D 20 20
15F9:8D 02 D0 AE 3D CD DE 35 84
1601:CD A2 04 20 8E 16 CA 10 B1
1609:FA 60 A2 06 BD 4E 17 9D 72
1611:07 D4 CA 10 F7 60 A2 06 DC

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1619:BD 4E 17 9D 00 D4 CA 10 6D
1621:F7 60 20 17 16 A9 13 8D E1
1629:17 D4 A9 1F 8D 18 D4 20 D3
1631:89 16 A9 41 8D 04 D4 AE C5
1639:00 CD 8E 45 CD BD 80 CB 31
1641:8D 47 CD BD 00 CB 8D 0D F2
1649:CD A9 21 8D F8 07 8D F9 BC
1651:07 BD 40 CB 8D 0E CD 8D 03
1659:27 D0 A9 00 9D 00 CB 9D A4
1661:40 CB 8D 28 D0 BD 00 CA 1D
1669:8D 01 D0 8D 03 D0 BD 40 A6
1671:CA 8D 00 D0 8D 02 D0 60 E9
1679:A9 05 8D 10 CD 4C 8E 16 41
1681:A9 0F 8D 10 CD 4C 8E 16 CB
1689:A9 46 8D 10 CD CE 0F CD 64
1691:D0 FB CE 10 CD D0 F6 60 FF
1699:20 89 16 EE F8 07 EE F9 A5
16A1:07 AD F8 07 C9 24 D0 F0 BD
16A9:A9 81 8D 04 D4 A2 04 A0 D6
16B1:03 20 89 16 C8 C8 8C 01 7D
16B9:D4 EE 03 D0 CE 01 D0 CA 60
16C1:10 EF 60 A9 02 8D 15 CD D6
16C9:20 81 16 CE 15 CD A9 0E 57
16D1:8D 01 D4 AD 01 D0 69 03 9B
16D9:CD 14 CD D0 01 60 AD 1B B8
16E1:CD C9 24 F0 09 EE 01 D0 D1
16E9:EE 03 D0 4C F5 16 CE 01 D3
16F1:D0 CE 03 D0 AD 23 CD C9 07
16F9:2A F0 14 EE 00 D0 EE 02 0C
1701:D0 AD 15 CD 10 C2 EE 00 EB
1709:D0 EE 02 D0 4C C4 16 CE 19
1711:00 D0 CE 02 D0 AD 15 CD A2
1719:10 AE CE 00 D0 CE 02 D0 6B
1721:4C C4 16 A9 04 8D 01 D4 31
1729:20 89 16 AD F8 07 CD 20 07
1731:CD F0 14 B0 09 EE F8 07 0D
1739:EE F9 07 4C 29 17 CE F8 3F
1741:07 CE F9 07 4C 29 17 A9 35
1749:0E 8D 01 D4 60 FF 04 FF 5A
1751:07 80 C1 FC 24 24 28 28 55
1759:2A 26 2A 26 2B 25 29 27 35
1761:27 29 25 2B AD 11 CD 29 3B
1769:03 AA BD 5D 17 8D 20 CD 4E
1771:20 24 17 BD 55 17 8D 1B B4
1779:CD BD 59 17 8D 23 CD AE DD
1781:00 CD 8E 46 CD BD 00 CA 89
1789:8D 14 CD BD 40 CA 8D 53 B4
1791:CD 20 C4 16 A9 24 8D 20 C1
1799:CD 20 24 17 A2 03 8E 01 EB
17A1:D4 20 89 16 CE 03 D0 EE E7
17A9:01 D0 AD 00 D0 CD 53 CD 74
17B1:F0 11 B0 09 EE 00 D0 EE 4B
17B9:02 D0 4C C4 17 CE 00 D0 B7
17C1:CE 02 D0 CA 10 DB A9 21 03
17C9:8D 20 CD 20 24 17 A9 80 D3
17D1:8D 04 D4 A9 00 8D 00 D0 04
17D9:8D 02 D0 AE 00 CD AD 0D F3
17E1:CD 9D 00 CB AD 0E CD 9D F9
17E9:40 CB 60 AD 1D CD D0 01 D4
17F1:60 8D 3B CD AD 11 CD 29 6E
17F9:03 AA BD 5D 17 8D 1F CD DC
1801:BD 61 17 8D 21 CD A9 13 CA
1809:8D 17 D4 20 0B 16 A9 21 87
1811:8D 0B D4 8D FA 07 8D FC 4A
1819:07 AE 1E CD BD 40 CB 8D 2D
1821:29 D0 BD 00 CA E9 03 8D 63
1829:05 D0 8D 09 D0 BD 40 CA 1B
1831:8D 04 D0 8D 00 D0 A9 00 F2
1839:8D 2B D0 9D 00 CB 20 EE 4D
1841:0D 20 89 16 AD FA 07 8D 87

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1849:0A D4 C9 25 F0 0F EE FA DB
1851:07 EE FC 07 CE 05 D0 EE EB
1859:09 D0 4C 42 18 20 89 16 5A
1861:AD FA 07 CD 21 CD F0 09 10
1869:EE FA 07 EE FC 07 4C 5E 9A
1871:18 AD 1F CD 8D 20 CD 20 82
1879:24 17 A9 FC 8D 0D D4 A9 7A
1881:80 8D 0B D4 20 89 16 A9 01
1889:81 8D 0B D4 A9 11 8D 17 50
1891:D4 A9 01 8D 2A D0 8D 21 60
1899:CD A9 20 8D FB 07 AD 01 50
18A1:D0 69 02 8D 07 D0 AD 00 84
18A9:D0 8D 06 D0 20 79 16 EE 75
18B1:21 CD AD 21 CD 8D 08 D4 37
18B9:AD 07 D0 CD 05 D0 F0 21 E7
18C1:B0 06 EE 07 D0 4C CC 18 83
18C9:CE 07 D0 AD 06 D0 CD 04 2B
18D1:D0 F0 D9 B0 06 EE 06 D0 B5
18D9:4C AD 18 CE 06 D0 4C AD 45
18E1:18 A9 01 8D 08 D4 A9 80 E8
18E9:8D 0B D4 A9 00 8D 06 D0 EB
18F1:8D 08 D0 A9 2C 8D FA 07 34
18F9:20 89 16 AD FA 07 C9 30 F1
1901:F0 06 EE FA 07 4C F9 18 30
1909:A9 00 8D 04 D0 AE 26 CD 5D
1911:DE 35 CD 60 00 00 00 00 BF

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Michael Sedlezky, the author of *Hover-Jet* (October 1991), lives in Mississauga, Ontario, Canada.

COUNTRY CAB

Alain Tremblay

The people in a remote countryside community are looking for a cabdriver. The job has a certain appeal, and you decide to apply for it. Unfortunately, there is another contender for the position, so the residents must find a way to determine which of you to hire. They decide to put both of you to a test, with the job going to the most reliable cabdriver.

In this one- or two-player game, the first player to reach 500 gas points and attain a rating of A wins the game. You are also penniless and must earn enough money to pay for the local cabdriver's license.

Entering the Program

Country Cab is written entirely in machine language. To type it in, use *MLX*, our machine language entry program. See "Typing Aids" elsewhere in this section. When *MLX* prompts, respond with the following values.

Starting address: 0801
Ending address: 1CB0

The screen is divided into two halves,

a half for each cab. Each player can drive his or her car freely along roads and country lanes. The halves are separated by two lines of text. These lines provide players with useful information about their respective ratings, gas points earned, and fare status.

Only part of the countryside is visible at a time, and it's very easy to drive off the road. No harm will come unless you run into a fence or a tree at high speed. You may bog down, however. Unlike in real traffic, collisions have no effect at all.

One joystick is required to control each car. To accelerate, move the stick forward. Move the stick right or left to turn, and pull it back to brake. To shift into reverse gear, bring your car to a complete stop and press the fire button. Repeat the process to shift the cab back into forward gear.

From time to time, potential fares will appear on the road. A fare's presence is indicated by an onscreen hand. Its thumb points in the direction in which you're likely to find the waiting fare. The fare itself will appear on your screen as a flashing green character. To pick up a fare, stop your car close to the flashing character. The fare will point you toward his or her destination. The exact spot on the road is marked by an X, which flashes on your screen as you drive by. If another customer appears, feel free to stop. You can pick up as many as two fares at a time. Just as you would with human passengers, you'll have to humor you fares to win their esteem. Some will tell you to drive slower; others faster. Do as they say if you want your rating to improve and earn the job as driver.

They also pay, and you need gas points to win the game. Drive according to your fare's indications and check his or her mood. Infuriated fares exasperated by a driver's lack of compliance will leave without paying. Some fares are special. Watch out for a monster that eats cabdrivers who make him angry. A prison escapee is a generous fellow, but giving him a ride is unlawful. Picking him up could get you in trouble with the sheriff. There's also a robber who may change your fortune for the worse. In most cases, though, it's best to do exactly as you are told.

Edit Your Maps

Also included is an optional editor that allows you to edit, save, and load previously saved maps so you can change the game's layout.

Map Editor is written entirely in machine language. Use *MLX* again to enter it. When *MLX* prompts you, respond with the following values.

Starting address: 2000

Ending address: 2247

Remember to save a copy of the program before you exit *MLX*.

To use *Map Editor*, load *Country Cab* without running it; then load *Map Editor* with the .8,1 extension. Then type SYS 8192 and press Return.

The screen will clear, and you will then see a much reduced and approximate representation of the actual map found in the game.

The map is composed of 12 x 21 "tiles." Each tile is composed of several characters to make up roads, trees, and so on. On the editor's screen, each tile is represented by a single character which roughly depicts its corresponding tile in the game. There are 21 such characters. The only character which may be difficult to decipher is the Commodore club character (ASCII 120 or Screen Code 88). This figure represents a forest tile.

Edit from the keyboard. Each tile character has a corresponding letter listed at the top of the screen. A cursor helps you to see where your next selection will be entered. The Home, Del, Return, and cursor keys work the same as in BASIC except that the cursor is restricted to the 12 x 21 area. You can use the space bar instead of the G key to enter blanks. Press f3 to load a saved map and f5 to save the one you are currently editing. In both cases you will be asked for a filename. After the load or save, you may resume editing.

To play the game, press f7. Be sure you have saved it first, or your editing will be lost. Once a game has started, you cannot return to the editor.

Any saved map can only be played after it has been loaded by the map editor. You cannot substitute your own map for the original one found in the game. That would require the game being rewritten and compiled.

COUNTRY CAB

```
0801:0B 08 0A 00 9E 32 30 36 2E
0809:32 00 00 00 00 20 D3 11 6B
0811:20 9B 14 20 DD 15 20 8B AB
0819:0F A2 40 A9 00 95 37 9D 5E
0821:F0 3F 9D D0 CF BD FA 11 B6
0829:9D 00 D4 CA 10 ED 20 A4 6C
0831:0E 20 84 10 20 13 12 A2 F5
0839:02 20 1D 0A A9 D0 9D F9 5C
0841:07 A9 C0 9D F8 07 0A 95 BE
0849:4C 20 C5 0E CA CA 10 E9 AC
0851:20 0D 0F 20 76 10 20 4F 1C
0859:0A C6 2C D0 34 A2 02 B5 98
0861:67 48 F0 06 D6 67 A0 07 52
0869:D0 05 B5 4C 20 E3 09 8A CB
0871:F0 02 A2 07 B9 DB 09 9D 2C
0879:07 D4 B9 D3 09 9D 08 D4 5A
0881:68 D0 05 A9 21 9D 0B D4 9F
0889:8A F0 02 A2 02 CA CA 10 66
0891:CE C6 2B D0 C1 A2 02 AD 77
0899:01 DC 29 1F C9 10 B0 31 99
08A1:B4 4C 10 2D B4 64 10 09 54
08A9:C8 30 23 20 EC 09 4C 54 09
08B1:08 56 4C B5 5C 49 08 95 ED
08B9:5C 8A D0 0A AD E0 05 49 99
08C1:9B 8D E0 05 D0 08 AD 08 79
08C9:06 49 9B 8D 08 06 4C 8F FB
08D1:09 B4 5B D0 04 B4 FB 10 07
08D9:02 A9 1D 4A 6A D6 FC D0 17
08E1:31 A0 10 94 FC B0 1B 16 F4
08E9:4C D0 17 76 4C B5 64 30 D0
08F1:02 94 FB B5 5B F0 08 4A FB
08F9:F0 03 4A 95 5B 56 FC 4C 60
0901:82 09 A8 30 D0 56 4C F0 F9
0909:06 B5 4C D5 5C B0 02 36 52
0911:4C 98 B4 3C 4A B0 0B 88 7D
0919:88 88 30 14 C0 7D 90 10 06
0921:A0 80 4A B0 0B C8 C8 CD
0929:10 06 C0 83 B0 02 A0 7F 63
0931:20 B9 09 A0 00 B5 3C 10 4C
0939:04 88 88 49 FF C8 84 02 43
0941:20 E3 09 B9 CB 09 D0 04 41
0949:95 5F F0 45 D5 3D B0 41 B6
0951:A9 00 95 3D BD F8 07 65 04
0959:02 29 0F 09 C0 9D F8 07 9E
0961:09 10 9D F9 07 C0 06 90 27
0969:18 B5 4C 4A 90 13 2A 95 DD
0971:5F A4 0C D0 03 D8 94 FB 4A
0979:C0 E0 90 09 4E 7A 09 D0 06
0981:10 A9 00 95 5F B5 FB 30 59
0989:08 A9 E0 8D 7A 09 20 C5 FC
0991:0E B5 5B 4A 15 5F 95 5F D8
0999:AD 00 DC CA CA 30 03 4C 34
09A1:9B 08 A5 4C 18 65 4E 20 10
09A9:E3 09 B9 47 0A 8D 55 0A D6
09B1:38 2A 0A 85 2B 4C 57 08 45
09B9:C0 00 30 07 88 F0 08 88 43
09C1:4C C8 09 C8 F0 01 C8 94 8B
09C9:3C 60 00 00 1C 18 14 10 8B
09D1:0C 08 04 02 01 01 01 9B
09D9:01 01 FF FD F8 88 86 84 20
09E1:82 20 A0 07 0A B0 03 88 63
09E9:D0 FA 60 A9 00 95 64 95 7E
09F1:FB 86 04 A0 02 8A 4A AA A7
09F9:69 02 D9 60 08 D0 09 A9 81
0A01:FF 99 63 00 8A 20 63 0C 8F
0A09:A6 04 84 26 84 28 88 88 C2
0A11:10 E3 20 1D 0A 98 AA A9 AD
0A19:1E 4C B5 0C A9 A0 8D 96 48
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PROGRAMS

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0A21:11 8A 48 20 8A 11 B0 FB 61 0C51:A9 22 C8 91 22 A9 20 C0 B1 0E81:E5 03 E0 01 D0 03 18 69 A9
0A29:68 AA 4A A8 A5 22 E9 11 8A 0C59:1F D0 F7 60 20 63 0C 4C 2D 0E89:7C 9D 92 14 98 D0 0B 66 63
0A31:95 B2 A5 23 E9 05 95 B3 E5 0C61:88 0B 85 02 4A 99 60 00 CA 0E91:02 90 03 BD 98 14 9D 72 D1
0A39:A9 02 99 82 00 99 80 00 65 0C69:99 09 D0 99 0D D0 85 26 21 0E99:00 60 A2 00 F0 18 AD 6B D0
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1281:B9	89	0F	85	22	98	0A	85	2C	14B1:22	C8	D0	02	E6	23	C9	FB	AA	16E1:5E	4F	09	5E	4F	09	5E	4F	C2
1289:04	B4	68	86	03	A6	04	B9	C6	14B9:D0	09	B1	22	85	FF	F0	12	05	16E9:09	5E	4F	09	5E	4F	09	5E	4D
1291:28	0D	85	02	D0	14	56	0E	6F	14C1:C8	A9	00	9D	80	2F	E8	D0	F5	16F1:4F	09	5E	4F	09	5E	4F	09	32
1299:00	14	A4	03	8A	4A	20	63	01	14C9:03	EE	C6	14	C6	FF	D0	F3	15	16F9								

PROGRAMS

```

1741:4B F0 54 5F 0C AF 30 4B 9C
1749:F0 54 5F 07 41 CF 08 41 FB
1751:CF 09 41 CF 0A 41 CF 0B CE
1759:41 09 41 CF 0B 45 0F 0A 4D EA
1761:50 46 7F 06 4E 50 46 7F 59
1769:05 4F 04 50 46 7F 04 4F FA
1771:05 50 46 7F 06 4E 50 46 60
1779:7D 4F 07 50 46 7F 08 0E
1781:50 46 7F 09 50 46 F0 0A 71
1789:50 4F 0B 50 B1 C4 1C D4 C7
1791:1C E4 CE 4C E4 CE 4C E4 85
1799:CE 4C E4 CE 4C E4 BE 4C 8B
17A1:E4 CE 4C E4 CE 4C E4 CE 0E
17A9:4C E4 CE 4C 4D 3C 43 C3 B7
17B1:BF 3C 4B F0 30 4F 0C AB C9
17B9:F0 0B 43 F0 0A 43 CF 09 A0
17C1:43 CF 08 43 CF 07 43 BF B9
17C9:0B 52 F0 0A 52 9F 09 52 46
17D1:98 F0 08 52 98 4F 07 52 11
17D9:98 D4 F0 06 52 98 E4 F0 B7
17E1:05 52 98 F0 04 4F 04 52 01
17E9:98 F0 05 4E 52 98 F0 06 03
17F1:4D 52 98 F0 07 45 29 8F AC
17F9:08 42 98 F0 09 4B 00 00 54
1801:00 55 1D 15 15 05 05 01 43
1809:01 40 40 50 50 D4 54 54 A9
1811:55 01 01 05 05 15 1D 15 68
1819:55 55 54 54 54 50 50 4D DD
1821:40 57 55 55 55 75 55 55 C7
1829:55 18 18 18 18 7E 3C 18 D9
1831:00 A5 A5 A9 A9 9A 5A 56 DC
1839:D6 75 55 55 5D 55 55 95 B2
1841:95 5A 5A 6A 6A A6 A5 95 93
1849:97 55 55 5D 55 55 56 E3
1851:76 55 75 55 AA AA 65 67 48
1859:55 59 59 D9 59 59 79 59 CF
1861:59 57 AD 5B DF 77 7F 56 B3
1869:FD 7F B5 FD DF 7D EB EF CB
1871:F5 57 F5 55 D5 55 75 D5 4B
1879:D5 57 7F 7F 5D 55 75 55 D2
1881:55 77 FD FF D9 56 75 55 62
1889:55 57 55 D5 D5 75 55 55 C6
1891:55 00 40 44 55 05 05 04 85
1899:15 00 44 44 10 10 44 44 AE
18A1:00 C0 00 00 F0 00 00 78 02
18A9:00 C0 1E 01 80 0F 03 80 A4
18B1:07 83 00 0B E7 00 1D DF 50
18B9:00 2E BF 00 77 7F 00 3A 61
18C1:FE 00 D9 FE 00 E7 FC 00 36
18C9:5F FA 00 3F F7 00 1F FF 5A
18D1:80 07 FF C0 00 FF C0 00 91
18D9:3F 80 00 1E 00 00 0C FB BF
18E1:04 C0 00 01 80 00 03 80 DE
18E9:03 83 00 0B A7 00 1D DF 84
18F1:00 2E BF 00 77 7F 00 3A 99
18F9:FE 00 D9 FE 00 E7 FC 00 6E
1901:5F FA 00 3F F7 00 1F FF 93
1909:80 07 FF C0 00 FF C0 00 CA
1911:3F 80 00 1E 00 00 0C FB F8
1919:0B 01 FF 00 03 01 80 02 30
1921:00 80 02 00 80 02 7C 80 39
1929:02 82 80 03 01 80 07 7D D2
1931:80 02 C6 80 03 83 80 02 2E
1939:82 80 02 82 80 03 7D 80 C0
1941:02 82 80 03 01 80 03 FF 65
1949:80 02 10 80 02 10 80 01 98
1951:FF FB 09 1F 00 00 20 E0 B6
1959:00 40 10 00 40 18 00 BE BE
1961:10 01 C1 10 01 40 A0 01 60
1969:3C A0 03 C2 40 02 83 40 BF
1971:03 83 80 04 84 80 07 7D 08
1979:00 0C 0B 00 0B 0A 00 10 A0
1981:F6 00 08 8C 00 07 84 00 1E
1989:00 78 FB 0A C0 00 03 20 26
1991:00 04 10 00 08 08 00 7F A6
1999:04 00 50 82 00 88 42 01 A7
19A1:74 44 06 42 48 08 81 50 B9
19A9:1F 82 60 28 45 80 44 39 88
19B1:00 42 26 00 25 28 00 18 1B
19B9:D0 00 08 60 00 04 80 00 6C
19C1:03 FB 0E 30 00 00 C8 00 CA
19C9:17 04 00 1F 04 00 E8 C2 2F
19D1:03 3C 42 1C C2 21 7D 03 37
19D9:21 93 01 4E 88 87 B0 88 D2
19E1:F8 C0 54 A7 00 63 38 00 C3
19E9:21 C0 00 16 00 00 08 FB 4A
19F1:1C 02 00 7F FF FE 8E 8B 4F
19F9:83 89 FC 41 89 02 21 F9 94
1A01:02 21 89 02 21 89 FC 41 3A
1A09:8E 8B 83 7F FF FE FB 1A DD
1A11:AA 00 02 AA 00 02 AA 00 E2
1A19:02 AA 00 02 FE 00 02 FE 14
1A21:00 03 C3 80 03 AB 80 03 61
1A29:AB 80 03 AB 80 03 AB 80 56
1A31:02 EE 00 02 FE 00 02 FE 3D
1A39:00 02 AA 00 02 AA 00 02 FF
1A41:AA 00 00 AA FB 0C 2A 00 D9
1A49:00 2A A0 00 2A A0 00 2A 1A
1A51:A0 00 3F A0 00 FF 80 00 C8
1A59:C3 80 00 AB 80 03 AB 80 32
1A61:03 AB 00 03 AB 00 00 CF 5F
1A69:00 03 FF 00 0A FE 00 0A B4
1A71:A8 00 0A A8 00 00 A8 FB 13
1A79:10 80 00 02 A0 00 0A A0 AF
1A81:00 00 A8 00 3F A8 00 FF 67
1A89:E8 00 CB E8 03 EB E0 0F D2
1A91:AA E0 0C AB C0 2F AB 00 A9
1A99:2B EF 00 2B F8 00 2A F0 1F
1AA1:00 0A B0 00 0A 80 00 02 C2
1AA9:80 FB 13 20 00 00 A8 00 D2
1AB1:00 A8 00 3F 28 00 C3 E8 B5
1AB9:03 28 EA 03 A8 EA CA AA FB
1AC1:E0 AF A8 80 AF 0F 00 2B 54
1AC9:FE 00 28 C0 00 2A 00 00 37
1AD1:08 FB 24 A3 FF AB AF 03 CC
1AD9:EA AF AB EA 0F AB EA AF 40
1AE1:AB EA AF 03 EA A3 FF AB 5B
1AE9:FE 16 FB 00 06 2A E9 D4 A2
1AF1:0B 2D 0D 74 12 D9 42 20 7C
1AF9:B9 70 66 E0 97 99 CF D1 96
1B01:A2 2C 00 14 22 D1 CD A4 6D
1B09:2D 60 B0 4E 6D 60 A2 D3 EE
1B11:79 D0 D8 09 AC 04 4E 06 FB
1B19:07 CD 09 2D A4 2D B0 C9 3F
1B21:08 AD 15 ED 07 D2 62 93 E1
1B29:27 1C E0 B4 0A D0 D9 43 EB
1B31:4A E0 29 42 2D 77 FD 1A 6B
1B39:22 C0 4D 32 26 D9 AF 07 70
1B41:32 09 67 BD 27 B7 FD 86 36
1B49:20 92 02 94 B2 D3 09 A2 57
1B51:9F D8 62 09 20 B4 29 2D BD
1B59:09 2D C7 AD 37 47 3F 00 88
1B61:92 DC 7A D1 90 DC D7 9D C9
1B69:B4 0A F0 42 68 47 3D 29 C2
1B71:10 82 29 D7 7B F0 A4 2D 09
1B79:67 79 A2 9D 37 29 D0 67 57
1B81:5E 0C 7A 9D 10 92 29 D4 05
1B89:9D 7B 29 09 A0 9A D0 30 64
1B91:47 F0 C7 AE 92 DA 42 DB EB
1B99:47 72 9E 08 62 09 22 03 E2
1BA1:9A 61 64 73 00 73 9C 04 4C
1BA9:73 A9 40 A2 20 39 07 7C A6
1BB1:D5 A7 47 9D 97 11 29 D9 AC
1BB9:42 94 33 52 99 CD DF FF 85
1BC1:FF FF 6C 9A 41 D2 71 A7 0F
1BC9:9D A7 A9 49 A2 91 08 22 10
1BD1:67 79 A2 90 00 00 44 00 FF
1BD9:04 99 99 98 88 04 40 33 3D
1BE1:37 44 82 55 55 54 63 37 64
1BE9:44 3A 42 37 01 44 03 37 E2
1BF1:00 23 34 43 44 43 63 33 D4
1BF9:3A 47 37 00 23 00 34 40 C7
1C01:33 37 44 03 33 37 44 34 8C
1C09:03 40 3A 42 30 43 23 00 13
1C11:34 43 00 34 03 74 03 04 6B
1C19:30 30 03 44 30 43 44 23 54
1C21:33 A4 43 03 00 34 43 40 4C
1C29:34 44 23 A4 44 75 23 3A B3
1C31:44 34 43 74 40 30 00 48 53
1C39:14 00 04 03 04 23 33 33 72
1C41:38 89 33 24 46 33 A4 00 E8
1C49:00 04 04 00 00 00 00 04 07
1C51:44 00 2E BD EA 3C CA 95 C0
1C59:6C DB D6 BA 49 BB 3F 7D 7A
1C61:BD B2 BF 02 E5 2D B2 07 5E
1C69:64 F1 6D 27 AB BF ED 7F 28
1C71:5D A9 2F DE E3 D5 FF 9D AA
1C79:DB E9 4F AF 67 90 79 65 D4
1C81:55 2D 29 AD 4B 51 3F FE CC
1C89:ED 5B 7B D5 F3 81 E3 84 4E
1C91:1E 22 06 D9 1F 9B 78 A1 B9
1C99:E2 D8 DF 9E C6 FC D1 C7 F4
1CA1:E5 84 36 24 7C B9 9F 7F 80
1CA9:F3 EB FE 20 00 00 00 00 B8

```

MAP EDITOR

```

2000:A9 2C 8D 14 08 8D 30 16 FF
2008:20 DD 15 A9 80 8D 8A 02 5E
2010:20 CB 20 A9 0C 8D 21 D0 9B
2018:8D 20 D0 20 74 21 20 E4 90
2020:FF A4 D3 AA D0 0F A5 A2 5F
2028:29 10 F0 0F 86 A2 B1 D1 04
2030:49 80 4C 39 20 B1 D1 29 E6
2038:7F 91 D1 8A C9 86 F0 66 30
2040:C9 87 F0 6D C9 88 D0 0B 59
2048:A2 00 1E CF 29 E8 D0 FA 24
2050:4C 0E 08 C9 93 D0 05 20 E1
2058:CB 20 D0 1B C9 91 F0 14 DC
2060:C9 9D F0 10 C9 55 B0 0F 20
2068:C9 20 90 08 D0 02 A9 47 51
2070:29 1F 09 40 20 D2 FF 38 B6
2078:20 F0 FF E0 05 B0 02 A2 A4
2080:05 E0 11 90 02 A2 10 C0 22
2088:0B B0 02 A0 0B 98 29 1F F0
2090:A8 18 20 F0 FF 20 D0 21 F9
2098:B1 22 29 F0 9D CF 29 20 F5
20A0:1F 21 D0 F4 F0 22 20 34 A6
20A8:21 A9 00 20 D5 FF 4C C5 F2
20B0:20 20 34 21 A9 CF 85 22 5B
20B8:A9 29 85 23 A2 C0 A0 2A AA
20C0:A9 22 20 D8 FF 20 CB 20 28
20C8:4C 1E 20 A9 93 20 D2 FF 18
20D0:A9 90 20 D2 FF A2 00 A0 66
20D8:00 8A 99 28 04 09 40 99 CF
20E0:00 04 C8 C8 C0 51 B0 09 7D
20E8:E8 E0 14 D0 EC A0 51 D0 C2
20F0:E8 A2 00 8A 9D 00 8D 9D 33
20F8:00 D9 9D 00 DA E8 D0 F4 74

```



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2100:20 0D 21 BD CF 29 91 22 FD
2108:20 1F 21 D0 F6 A2 00 A0 36
2110:0B A9 C8 85 22 A9 04 85 F8
2118:23 A9 1E 8D 18 D0 60 C8 80
2120:C0 20 90 0C A5 22 69 27 4D
2128:85 22 90 02 E6 23 A0 0B F7
2130:E8 E0 FC 60 A9 15 8D 18 99
2138:D0 A2 14 A0 00 18 20 F0 A9
2140:FF A2 00 BD 6A 21 20 D2 F1
2148:FF E8 E0 0A D0 F5 A0 00 21
2150:20 CF FF 99 00 90 C8 C9 CD
2158:0D D0 F5 98 A2 00 A0 90 84
2160:20 BD FF A2 08 A0 FF 4C 5B
2168:BA FF 46 49 4C 45 4E 41 BA
2170:4D 45 3F 3A 78 A9 33 85 8C
2178:01 A2 00 BD 00 D0 9D 00 3E
2180:3A BD 00 D1 9D 00 39 BD 89
2188:9B 21 9D 00 38 49 FF 9D 19
2190:00 3C E8 D0 E6 A9 37 85 DD
2198:01 58 60 FB F6 EC D8 B0 0B
21A0:60 C0 80 18 18 66 66 18 14
21A8:18 3C 00 01 03 07 0F 77
21B0:0F 0F 0F 0F 0F 0F 0F F2
21B8:07 03 01 80 C0 60 B0 D8 29
21C0:EC F6 FB 00 00 00 00 1F D5
21C8:3F 7F FF FF 7F 3F 1F 00 C1
21D0:00 00 00 00 00 00 00 13
21D8:00 00 00 FF FF FF FF 1B
21E0:FF FF FF 00 00 00 00 FF 23
21E8:FF FF FF 00 00 00 00 FF 2B
21F0:00 FF FF 0F 0F 0F 0F 06
21F8:0F 0F 0F 0F 0F 0F 0F 95
2200:F0 F0 F0 00 00 00 00 F8 10
2208:FC FE FF DF 6F 37 1B 0D 24
2210:06 03 01 80 C0 E0 F0 F0 9C
2218:F0 F0 F0 F0 F0 F0 F0 5C
2220:E0 C0 80 FF FF FF FF 15
2228:00 00 00 FF FF 00 FF 6C
2230:00 00 00 FF FE FC F8 52
2238:00 00 00 01 03 06 0D 1B F1
2240:37 6F DF 00 00 00 00 F7

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JANUS

Bruce M. Bowden

A 128 with a 1571 or 1581 can load programs much faster than a 64 or a 128 in 64 mode. With this utility, you can take advantage of the 128's speed to load 64 BASIC programs.

Janus is named for the Roman god with two faces to emphasize the fact that it uses both 64 and 128 modes to load a 64 program. There are a couple of advantages for operating this way. First, the 128 can load programs very quickly from a 1571 or 1581 disk drive. Second, you can save a BASIC program and make it available to others so that they needn't be concerned about whether or not their 128 is in the proper mode when they try to run it.

Getting Started

Janus is written entirely in BASIC. To avoid typing errors, enter the program with *The Automatic Proofreader*. See "Typing Aids" elsewhere in this section. When you've finished typing *Janus*, be sure to save a copy of the program to disk before running it.

How to Use Janus

Remember that the *Janus* loader must be loaded and run with your computer in 128 mode. The loader will then set up the machine code and prompt you for a 64 BASIC program name. Should the program being loaded exceed 90 blocks, *Janus* will abort with a message advising you that the program is too large for it to handle.

After the 64 program has been successfully loaded, a message will appear saying that the new loader file may now be saved. Save this new loader in the conventional manner, either by entering SAVE "filename", 8 or DSAVE "filename". The new file can be loaded into a 64 or 128 and run.

You'll notice a big difference when you load the new file in 128 mode. It will take advantage of the 1571's higher speed for loading; then the 128 will switch automatically to 64 mode when the program runs. If you load the program into a 128 in 80-column mode, you'll be advised to switch to the 40-column screen and press a key.

JANUS

```

GD 10 REM COPYRIGHT 1991 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
JA 100 REM "JANUS, A COMMODORE
    64 BASIC PROGRAM LOADE
    R FOR LOADING FROM BOTH
    "
QP 110 REM "THE COMMODORE 64 A
    ND 128 MODES."
RJ 140 PRINTCHR$(147)CHR$(14)C
    HR$(17)CHR$(17)"SETTING
    UP..."
PE 150 RESTORE220:Y=DEC("1300"
    ):IF PEEK(215) THEN FAS
    T
QD 160 READB$:IF B$="EOF" THEN
    SLOW:SYS DEC("1300")
JS 170 IF LEFT$(B$,1)<>"E" AN
    D LEFT$(B$,1)<>"@" THEN
    210
FH 180 A$=B$:N=0:FOR X=0 TO 15
    :READ B$:POKEY=X,DEC(B$
    ):N=N+DEC(B$):NEXT

```

```

JS 190 READB$:IF N<>VAL(B$) TH
    EN 210
QB 200 Y=Y+16:GOTO160
XR 210 PRINT"THERE IS A DATA E
    RROR IN THE LINE BEGINN
    ING WITH ";A$:END
HD 220 DATA @1,20,7D,FF,0E,0D,
    0D,70,4C,41,43,45,20,54
    ,48,45,20,1130
EJ 230 DATA @2,44,49,53,4B,20,
    54,4F,20,42,45,20,55,53
    ,45,44,20,1030
JG 240 DATA @3,49,4E,54,4F,20,
    54,48,45,20,44,49,53,4B
    ,20,44,52,1084
RM 250 DATA @4,49,56,45,0D,41,
    4E,44,20,45,4E,54,45,52
    ,20,54,48,1054
QB 260 DATA @5,45,20,63,4F,4D,
    4D,4F,44,4F,52,45,20,36
    ,34,20,50,1060
HG 270 DATA @6,52,4F,47,52,41,
    4D,20,66,69,6C,65,20,6E
    ,61,6D,65,1353
CH 280 DATA @7,2E,0D,0D,00,20,
    7E,13,4C,E7,13,00,00,00
    ,00,00,00,575
PQ 290 DATA @8,00,00,00,00,00,
    00,00,00,00,00,00,00,00
    ,00,A9,00,169
SK 300 DATA @9,8D,FD,03,8D,20,
    D0,8D,21,D0,20,7D,FF,1C
    ,5F,9D,9A,2006
GX 310 DATA @A,00,20,E4,FF,F0,
    FB,8D,FE,03,20,D1,13,90
    ,16,AE,FD,2257
PC 320 DATA @B,03,9D,6A,13,EE,
    FD,03,20,D2,FF,AE,FD,03
    ,E0,11,D0,2155
DG 330 DATA @C,D8,4C,C2,13,C9,
    0D,D0,01,60,C9,14,D0,D4
    ,AD,FD,03,2094
SM 340 DATA @D,F0,C7,CE,FD,03,
    20,7D,FF,9D,20,20,9D,9D
    ,00,4C,89,2061
SJ 350 DATA @E,13,8D,FE,03,18,
    C9,20,90,09,E9,5B,B0,05
    ,AD,FE,03,1762
KK 360 DATA @F,38,60,AD,FE,03,
    18,60,A9,6A,85,FB,A9,13
    ,85,FC,A9,2103
PA 370 DATA @G,0F,A2,08,A0,00,
    20,BA,FF,AD,FD,03,A6,FB
    ,A4,FC,20,2112
RB 380 DATA @H,BD,FF,A9,00,A2,
    01,A0,20,20,D5,FF,8C,11
    ,12,8C,D0,1991
FF 390 DATA @I,15,8E,10,12,8E,
    CF,15,AD,11,12,85,FC,C9
    ,80,B0,03,1668
QC 400 DATA @J,4C,77,14,20,7D,
    FF,0D,0D,74,48,45,20,62
    ,61,73,69,1357
FP 410 DATA @K,63,20,50,52,4F,
    47,52,41,4D,20,49,53,20
    ,54,4F,4F,1129
PC 420 DATA @L,20,4C,4F,4E,47,
    20,46,4F,52,20,54,48,45

```



```

,20,4C,4F,1043
FA 430 DATA @M,41,44,45,52,2E,
      0D,70,4C,45,41,53,45,20,
      41,43,43,1048
JE 440 DATA @N,45,50,54,20,4D,
      59,20,41,50,4F,4C,4F,47,
      49,45,53,1138
MJ 450 DATA @O,2E,0D,0D,00,4C,
      09,40,A9,14,85,FC,A9,1C,
      85,FE,A9,1548
XM 460 DATA @P,CC,85,FB,A9,01,
      85,FD,A2,16,A0,9D,20,72,
      16,A9,00,1982
XM 470 DATA @Q,8D,00,FF,20,7D,
      FF,0E,0D,0D,79,4F,55,20,
      4D,41,59,1396
BK 480 DATA @R,20,4E,4F,57,20,
      53,41,56,45,20,54,48,45,
      20,50,52,1062
XA 490 DATA @S,4F,47,52,41,4D,
      20,49,4E,20,54,48,45,20,
      4E,4F,52,1085
MF 500 DATA @T,4D,41,4C,20,57,
      41,59,0D,00,4C,09,40,18,
      1C,0A,00,715
EQ 510 DATA @U,8B,20,C2,28,36,
      32,29,B2,32,38,20,A7,20,
      9E,37,32,1328
KS 520 DATA @V,30,34,00,22,1C,
      14,00,9E,32,32,34,39,00,
      00,00,A9,718
DP 530 DATA @W,0E,8D,00,FF,A9,
      20,8D,06,1D,A9,80,85,FE,
      A0,00,84,1763
XF 540 DATA @X,FD,A9,1C,85,FC,
      A9,E8,85,FB,A2,1D,A0,D2,
      20,A7,1D,2409
BP 550 DATA @Y,A5,D7,F0,78,20,
      7D,FF,1C,0E,0D,0D,74,48,
      49,53,20,1596
GK 560 DATA @Z,49,53,20,54,48,
      45,20,38,30,2D,43,4F,4C,
      55,4D,4E,1056
GK 570 DATA @1,20,53,43,52,45,
      45,4E,20,53,45,54,54,4,
      9,4E,47,2E,1100
CH 580 DATA @2,2E,2E,0D,57,48,
      45,4E,20,59,4F,55,20,4,
      8,41,56,45,1020
CH 590 DATA @3,20,41,20,34,30,
      2D,43,4F,4C,55,4D,4E,2,
      0,53,43,52,1000
PH 600 DATA @4,45,45,4E,20,55,
      50,2C,0D,50,52,45,53,5,
      3,20,41,4E,1042
ME 610 DATA @5,59,20,4B,45,59,
      20,54,4F,20,43,4F,4E,5,
      4,49,4E,55,1125
KH 620 DATA @6,45,2E,0D,00,20,
      5F,FF,20,E4,FF,F0,FB,A,
      9,00,8D,00,1826
EM 630 DATA @7,FF,4C,4D,FF,A9,
      0C,8D,06,09,A9,80,85,FE,
      E,A0,00,84,1976
XP 640 DATA @8,FD,A9,08,85,FC,
      A9,E8,85,FB,A2,09,A0,D,
      2,20,A7,09,2349
JG 650 DATA @9,4C,E2,FC,09,80

```

```

,18,80,C3,C2,CD,38,30,A,
9,AE,8D,00,2025
SA 660 DATA @A,80,8D,02,80,A9,
      A7,8D,01,80,8D,03,80,4,
      C,1F,80,00,1512
SF 670 DATA @B,00,00,A2,FF,78,
      9A,D8,A2,00,8E,16,D0,2,
      0,A3,FD,20,1921
QR 680 DATA @C,50,FD,20,15,FD,
      {1}20,5B,FF,58,20,53,E4,
      20,BF,E3,A9,2067
FJ 690 DATA @D,00,8D,20,D0,8D,
      21{1}D0,A9,5E,85,FB,A9,
      80,85,FC,A9,2261
HP 700 DATA @E,C0,85,FE,A9,00,
      85,FD,A2,80,A0,EA,20,B,
      F,80,4C,00,2245
GF 710 DATA @F,C0,20,42,A6,AD,
      1D,80,AA,38,E9,18,8D,1,
      D,80,18,AC,1763
AE 720 DATA @G,1C,80,AD,1E,80,
      85,FC,A9,01,85,FB,85,F,
      D,A9,08,85,2122
KM 730 DATA @H,FE,20,61,C0,A9,
      00,8D,00,08,A9,08,85,2,
      C,A9,01,85,1550
SB 740 DATA @I,2B,AD,1D,80,85,
      2E,85,30,85,32,AD,1C,8,
      0,85,2D,85,1556
QR 750 DATA @J,2F,85,31,A4,2E,
      20,08,A4,A9,93,20,D2,F,
      F,A9,0E,8D,1780
BC 760 DATA @K,86,02,A9,A0,8D,
      84,02,85,34,85,38,20,3,
      3,A5,58,4C,1526
CF 770 DATA @L,AE,A7,8E,FE,03,
      8C,FD,03,A0,00,B1,FB,9,
      1,FD,A5,FC,2539
FB 780 DATA @M,CD,FE,03,D0,08,
      A5,FB,CD,FD,03,D0,01,6,
      0,E6,FB,D0,2549
PR 790 DATA @N,02,E6,FC,E6,FD,
      D0,E3,E6,FE,A9,00,F0,D,
      D,EA,EA,EA,3218
FB 800 DATA EOF

```

Bruce M. Bowden is a talent with many faces at *COMPUTE* magazine. □

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each *Gazette Disk* and are printed in all issues of *Gazette* through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free copies of both of these handy programs. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope.

Write to Typing Aids, *COMPUTE's Gazette*, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

BUG-SWATTER

In November's "Programmer's Page," Randy Thompson featured a short program called *Flood* that had been submitted by Geza Lucz. Due to a printing error, the listing was omitted from the column. That listing is printed below.

The object of the game is to build flood walls that will contain a spreading body of water (represented by asterisks). Move with the cursor keys and press Return wherever you want to build a section of wall. Your score is determined by how quickly and effectively you can accomplish this task. □

FLOOD

```

FM 100 POKE 53281,14:PRINT CHR
      $(147):POKE 53281,6
KF 110 DIM A(2000),B(299)
BS 120 B(1)=1:B(2)=-1:B(3)=40:
      B(4)=-40
KC 130 B(29)=1:B(157)=-1:B(145)
      )=-40:B(17)=40
GQ 140 FOR I=0 TO 39
FG 150 POKE 1024+I,42:POKE1984
      +I,42
DH 160 POKE 1024+INT(I/1.6)*40,
      42
MB 170 POKE 1063+INT(I/1.6)*40,
      42
MR 180 NEXT
CK 190 FOR W=1 TO 2
SD 200 A(W)=INT(RND(1)*999)+10
      24
AH 210 IF PEEK(A(W))<>32 THEN
      {SPACE}200
DG 220 POKE A(W),42
DX 230 NEXT
XE 240 B=2:A=1:R=32
JQ 250 H=1447:POKEH,102
GP 260 L=0
ER 270 FOR I=A TO B
JJ 280 FOR J=1 TO 4
DX 290 IF PEEK(A(I)+B(J))<>32
      {SPACE}THEN 310
GP 300 L=L+1:A(B+L)=A(I)+B(J):
      POKEA(B+L),42
BE 310 NEXT
FH 320 GOSUB 370
KG 330 NEXT
QB 340 A=B:B=B+L
MP 350 IF L=0 THEN PRINT "{CLR}
      CONGRATULATIONS. YOUR S
      CORE IS" 874-B:END
PP 360 GOTO 260
QH 370 GET RS:RS=RS+" "
PA 380 IF ASC(RS)=13 THEN R=R+1
AQ 390 IF PEEK(H+B(ASC(RS)))<>
      32 THEN RETURN
ED 400 POKE H,R
QM 410 H=H+B(ASC(RS))
RD 420 R=PEEK(H):POKE H,102
RB 430 RETURN

```


THE AUTOMATIC PROOFREADER

Philip I. Nelson

The Automatic Proofreader helps you type in program listings for the 128 and 64 and prevents nearly every kind of typing mistake.

Type in *Proofreader* exactly as listed. Because the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unusual commands. After you've finished, save a copy before running it.

Next, type RUN and press Return. After the program displays the message *Proofreader Active*, you're ready to type in a BASIC program.

Every time you finish typing a line and press Return, *Proofreader* displays a two-letter checksum in the upper left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, the line probably was typed correctly. If not, check for your mistake and correct the line.

Proofreader ignores spaces not enclosed in quotation marks, so you can omit or add spaces between keywords and still see a matching checksum. Spaces inside quotes are almost always significant, so the program pays attention to them.

Proofreader does not accept keyword abbreviations (for example, ? instead of PRINT). If you use abbreviations, you can still check the line by listing it, moving the cursor back to the line, and pressing Return.

If you're using *Proofreader* on the 128, do not perform any GRAPHIC commands while *Proofreader* is active. When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the *Proofreader*—to another memory area, causing *Proofreader* to crash. The same thing happens if you run any program with a GRAPHIC command while *Proofreader* is in memory.

Though *Proofreader* doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. To disable it, turn the computer off and then on. A gentler method is to SYS to the computer's built-in reset routine (65341 for the 128, 64738 for the 64).

```
AS 0 CLR
KK 10 VE=PEEK(772)+256*PEEK(77
3):LO=43:HI=44:PRINT"
```

```
{CLR}{WHT}AUTOMATIC PROO
FREADER FOR ";
EB 20 IF VE=42364 THEN PRINT "
64"
AA 30 IF VE=17165 THEN LO=45:HI
=46:GRAPHIC CLR:PRINT"1
28"
KK 40 SA=(PEEK(LO)+256*PEEK(HI
))+6:FOR J=SA TO SA+166:
READ B:POKE J,B:CH=CH+B:
NEXT
QF 50 IF CH<>20570 THEN PRINT
{SPACE}"**ERROR* CHECK TY
PING IN DATA STATEMENTS"
:END
PD 60 FOR J=1 TO 5:READ RF,LF,
HF:RS=SA+RF:HB=INT(RS/25
6):LB=RS-(256*HB)
XB 70 CH=CH+RF+LF+HF:POKE SA+L
F,LB:POKE SA+HF,HB:NEXT
SB 80 IF CH<>22054 THEN PRINT
{SPACE}"**ERROR* RELOAD P
ROGRAM AND CHECK FINAL L
INE":END
PH 90 IF VE=17165 THEN POKE SA
+14,22:POKE SA+18,23:POK
ESA+29,224:POKESA+139,22
4
JS 100 POKE SA+149,PEEK(772):P
OKE SA+150,PEEK(773):PR
INT"{CLR}PROOFREADER AC
TIVE"
FA 110 SYS SA:POKE HI,PEEK(HI
)+1:POKE (PEEK(LO)+256*P
EEK(HI))-1,0:NEW
PS 120 DATA120,169,73,141,4,3,
169,3,141,5,3,88,96,165
,20,133,167
PS 130 DATA165,21,133,168,169,
0,141,0,255,162,31,181,
199,157,227
XS 140 DATA3,202,16,248,169,19
,32,210,255,169,18,32,2
10,255,160
JC 150 DATA0,132,180,132,176,1
36,230,180,200,185,0,2,
240,46,201
XJ 160 DATA34,208,8,72,165,176
,73,255,133,176,104,72,
201,32,208
GM 170 DATA7,165,176,208,3,104
,208,226,104,166,180,24
,165,167
KH 180 DATA121,0,2,133,167,165
,168,105,0,133,168,202,
208,239,240
RM 190 DATA202,165,167,69,168,
72,41,15,168,185,211,3,
32,210,255
BR 200 DATA104,74,74,74,74,168
,185,211,3,32,210,255,1
62,31,189
RM 210 DATA227,3,149,199,202,1
6,248,169,146,32,210,25
5,76,86,137
HJ 220 DATA65,66,67,68,69,70,7
1,72,74,75,77,80,81,82,
83,88
XR 230 DATA 13,2,7,167,31,32,1
51,116,117,151,128,129,
167,136,137
```

ONLY ON DISK

In addition to the type-in programs found in each issue of the magazine, *Gazette Disk* offers bonus programs and original 64 and 128 artwork. Here are this month's bonuses.

The Raven

Daniel Lightner
Sidney, MT

Enter this machine language adventure game, and you'll find yourself in a three-dimensional maze that's filled with valuable treasure. The object is to locate the treasure and return it to a special storage area. The only obstacles are the puzzles that you'll have to solve and a number of deadly creatures blocking your path.

You are not alone, though. A friendly Hobbit named Harvey will help you find your way through the maze.

Trig 128

James Moore
Cleveland, OK

Use this handy 128 program to help you solve any triangle, not just right triangles. The program calculates sides to four decimal places and angles to the nearest second. The program will also help you determine the area of a triangle if you know an angle and the length of its two sides or if you know the length of three sides.

This program can be a real help to trigonometry students—but that's not all. *Trig 128* can also be used to find the distance between any two Cartesian coordinates.

Christmas Tunes

Don Radler
Cape Coral, FL

Enjoy these traditional Christmas songs and carols that have been collected by Don Radler. They can be played on the enclosed music program.

Gazette Gallery

Picture of the Month
"Rage"
By Jeff Boyle
Bethlehem, PA

"'Twas the Night"

"Santa's Best"
By Robert Woodall
Rural Hall, NC

HOW TO TYPE IN GAZETTE PROGRAMS

Each month, Gazette publishes programs for the Commodore 128 and 64. Each program is clearly marked as being written for the 128, 64, or both. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

At irregular intervals, we publish two programs designed to make typing in our programs easier: *The Automatic Proofreader*, for BASIC programs, and a 128 and 64 version of *MLX*, for entering machine language programs. In order to make more room for programs, we do not print these handy utilities in every issue of the magazine. Copies of these programs are available on every *Gazette Disk*. If you don't have access to a disk, write us, and we'll send you free copies of both of these programs. Please enclose a stamped, self-addressed envelope. Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

When entering a BASIC program, be especially careful with DATA statements, as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the com-

puter). If this happens, the only recourse is to turn your computer off and then on, erasing what was in memory. This could cause you to lose valuable data, so be sure to *save a program before you run it*. If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from Gazette, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor-down key; {5 SPACES} means to press the space bar five times. {RVS} means to enter Reverse mode by simultaneously pressing the Ctrl key and the 9 key.

To indicate that a key should be shifted (hold down the Shift key while pressing another key), the character is underlined. For example, A means hold down the Shift key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight shifted A's).

If a key is enclosed in special back-

ets, [<>], hold down the Commodore key (at the lower left corner of the keyboard) and at the same time press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the Ctrl key while typing the letter in braces. For example, {A} means to press Ctrl-A.

The Quote Mode

You can move the cursor around the screen with the Crsr keys, but you may want to move it under program control, as in examples like {LEFT} and {HOME} in the listings. The only way the computer can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote key, you're in quote mode. It can be confusing when you are in this mode if you mistype a character and cursor left to change it. You'll see a graphics symbol for cursor left. Use the delete key to back up and edit the line from the beginning. Type another quotation mark to get out of quote mode.

If things get too confusing, exit quote mode by pressing Return; then cursor up to the mistyped line and fix it. If the mistake involves cursor movement, however, you must press the quote key to reenter quote mode. □

When You Read:	Press:	See:	When You Read:	Press:	See:	When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME		{PUR}	CTRL 5				
{HOME}	CLR/HOME		{GRN}	CTRL 6			SHIFT	
{UP}	SHIFT		{BLU}	CTRL 7				
{DOWN}			{YEL}	CTRL 8				
{LEFT}	SHIFT		{F1}	f1				
{RIGHT}			{F2}	SHIFT f1				
{RVS}	CTRL 9		{F3}	f3				
{OFF}	CTRL 0		{F4}	SHIFT f3				
{BLK}	CTRL 1		{F5}	f5				
{WHT}	CTRL 2		{F6}	SHIFT f5				
{RED}	CTRL 3		{F7}	f7				
{CYN}	CTRL 4		{F8}	SHIFT f7				

For Commodore 64 Only			
	COMMODORE 1		
	COMMODORE 2		
	COMMODORE 3		
	COMMODORE 4		
	COMMODORE 5		
	COMMODORE 6		
	COMMODORE 7		
	COMMODORE 8		